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# Original Articles

## The Nature of the Tuberculin Reaction and Its Use in the Diagnosis and Treatment of Tuberculosis[1]


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Few subjects in medicine are as perplexing as the nature and mechanism of the action of Koch's old tuberculin despite a very large amount of clinical and laboratory investigation. Brought forward by its great discoverer as an immunizing and therapeutic agent, we have since learned that its immunizing power is almost negligible and its application in treatment surrounded by definite limitations. From the very beginning, when it led its discoverer grievously astray and induced him to make hasty statements and predictions, it has continued to baffle some of the best scientific minds in unraveling the nature and mechanism of its action.

What is the nature of the tuberculin reaction? From whence arise those general symptoms of fever, abnormal tendency to fatigue and ill-defined aches and pains, increased rapidity or irritability of the pulse, etc., following the subcutaneous injection of this substance? What is the nature of the reaction around the focus of tuberculous disease? What is the nature and mechanism of the truly wonderful skin reactions to tuberculin when this substance is applied to an abrasion, rubbed into the skin in an ointment, applied to the conjunctiva, or injected intradermally? Have these reactions any diagnostic and therapeutic values?

### THE ALLERGIC NATURE OF THE TUBERCULIN REACTION.

In the first place tuberculin is not a poison or toxin because relatively enormous amounts may be administered to non-tuberculous animals with impunity. Kraus has injected as much as 30 cc intravenously to *healthy* guinea-pigs, and Hamburger has given *healthy* infants as much as 1 cc at close intervals repeatedly over a long period without ill effects. But the injection of one-millionth of 1 cc may make a tuberculous adult ill. For the tuberculous, therefore, tuberculin acts like a virulent poison; for the non-tuberculous it is relatively inert.

Why the difference? From whence arise the toxic effects in the tuberculous individual if the tuberculin is not toxic? The evidence quite clearly indicates that these toxic substances arise from the tuberculous foci, and tuberculin stimulates and facilitates their absorption by producing hyperemia and other inflammatory changes in the tissues surrounding these foci. Similar effects may be produced by the patient by exercise. The ordinary constitutional symptoms of tuberculosis are quite similar to the general tuberculin reaction, and both

[1]Read before the Philadelphia County Medical Society, March 8, 1922.

are due to the passage of toxic substances from the focus of disease into the general circulation.

Why and how does tuberculin produce this inflammatory reaction around foci of tuberculous infection? This is an unsolved mystery, but evidence indicates that it is an allergic phenomenon—an example of local allergic shock.

The anaphylactic nature of the tuberculin reaction has been generally held since this view was proposed by Wolff-Eisner. It is commonly believed that as a result of infection an antibody is produced in the blood of the nature of an amboceptor or ferment which acts upon the injected tuberculin with the production of a poison (anaphylatoxin) responsible for the general, focal, and local (skin) reactions. But there are few or no facts to substantiate this theory. In the first place the presence of this antibody has not been conclusively demonstrated in the blood of tuberculous individuals or lower animals. An allergic antibody is produced, but it apparently is cellular—that is, upon or within the cells of the body rather than free in the blood. Even though it were free in the blood and capable of producing a poison by digestion of tuberculin, it is impossible to conceive how sufficient poison could be obtained from a millionth part of a cubic centimeter to produce the profound changes sometimes following the injection.

Anaphylaxis is commonly regarded as caused only by protein substances. The chemical nature of tuberculin has defied accurate definition. The active principle is biuret-free and dialyzable; if it is a protein, evidence indicates that it is a polypeptid or proteose. And anaphylaxis of the lower animals cannot be produced regularly with proteoses. Many investigators have stated that proteoses could not induce anaphylaxis at all, but recent investigations indicate that weak reactions are sometimes observed. But granting this, attempts to produce anaphylaxis in animals with tuberculin have generally failed. Tuberculin does not appear to produce anaphylactic sensitization and reactions.

How then can the tuberculin reaction be regarded as an allergic phenomenon? The tuberculin reaction can only be produced with regularity by active tuberculosis. Living tubercle bacilli must be introduced and actual lesions result before tuberculin hypersensitiveness is produced. This suggests that allergic sensitization is engendered by a substance elaborated only by living tubercle bacilli in living tissues. Is this allergen the same tuberculin as produced in culture media in the test-tube? Either it is the same or it is a very closely allied combination product of tuberculin and tissue cells because the tuberculin reaction is elicited by the injection of test-tube tuberculin and the allergic reaction is highly specific—that is, the substance eliciting the reaction is the same or very nearly so as that engendering sensitization. If this is true the failure to sensitize normal animals with test-tube tuberculin is due either to some undefined biological difference between focus tuberculin and test-tube tuberculin, or we do not know how to sensitize animals artificially with tuberculin. The latter assumption, however, is less significant than the former because we can with comparative ease sensitize and anaphylactize guinea-pigs with the proteins of the tubercle bacillus.

The allergen, therefore, is produced in the foci of tuberculosis; it gradually brings about an exquisite degree of active sensitization of the tissue cells not only surrounding the focus, but of distant organs as well, including the skin and mucous membranes. As a result of sensitization these sensitized cells contain the allergic antibody. When tuberculin is injected it unites with these sensitized cells, producing cellular allergic shock. This shock is characterized by its effect upon the vasomotor system, as is true of other types of allergy in man, as serum disease, hay-fever, and allergic asthma. One effect is hyperemia or dilatation of the vessels accompanied by serous and cellular exudation. If tuberculin has been injected subcutaneously in sufficient amounts this reaction of hyperemia and exudation takes place around the

foci of tuberculosis, and, depending upon the degree of reaction and the amount and permeability of the fibrous capsule, results in the absorption of the focus poisons with the production of general symptoms. When applied to the skin the effects are local and characterized by a local reaction of hyperemia and edema. This local reaction may be due in part, however, to the digestion of protein constituents of the culture medium by tissue ferments with the production of diffusible elements; likewise a part of the reaction may be due to trauma. The local reaction may be, therefore, in part a specific allergic reaction, in part a non-specific ferment reaction, and in part traumatic, the last two being especially likely to occur when the tuberculin is injected intracutaneously. In pollen allergy and allergies to sera, foods, and drugs the local reaction may occur within fifteen minutes, while in tuberculin allergy several hours are required. No adequate explanation for this time difference in reaction can be offered at present.

If the local and focal reaction to tuberculin is allergic shock and the constitutional reaction the result of increased absorption of poisons from the foci, are these reactions of diagnostic and therapeutic significance and value? In the first place, what is the nature of the focus poisons? Kraus has worked upon this subject extensively and believes them to be non-specific poisons produced by dead and decayed cells. We know that these cellular substances are highly toxic and can be produced from a variety of cells and other protein substances. They are non-specific and much of the nature of Vaughan's protein poison.

### THE DIAGNOSTIC VALUE OF THE TUBERCULIN REACTION.

The focal and local tuberculin reactions are highly specific—that is, they occur only in tuberculosis. This has been attested to by thousands of necropsies and the error found to be less than 3 per cent. A human being or lower animal may show a positive tuberculin reaction during life and the pathologist fail to find lesions at the necropsy, but this is due to the fact that allergic sensitization may be engendered and maintained by very small lesions, even by tubercles of microscopic size which may easily escape detection. This has happened so frequently that it is always necessary for the pathologist to demonstrate the tubercles. Sometimes these tubercles are healed in a clinical sense, that is, well fibrosed, and nothing may remain but a scar. Just how long sensitization can remain after all bacilli are killed and foci completely absorbed is unknown; it is known, however, that sensitization in clincally cured cases gradually decreases and may even become extinct. Sensitization rapidly increases during exacerbations of the disease, and persistently strong reactions are always suspicious of the presence of tubercles even when these are so small or so situated as to escape clinical detection and accompanied by good general health of the patient.

The tuberculin reaction, therefore, is highly diagnostic in the sense that it is specific. The focal reaction induced by the subcutaneous injection of tuberculin is helpful in the diagnosis of lesions which can be seen or studied clinically for the detection of hyperemia, exudation, and the effects of these. The local skin-mucous membrane reactions when positive indicate that the patient is tuberculous or has been cured in the clinical sense, without indicating the location of the lesion. They are of special value in the diagnosis of tuberculosis of children, and their value decreases with advancing years because so large a proportion of adults acquire lesions sufficient for sensitization but without demonstrable ill effects or recovery therefrom.

In advanced and acute tuberculosis the reaction may be negative, probably because of a process of desensitization by the absorption of tuberculin produced in the foci. Reactions may become negative during the course of tuberculin immunization for the same reason, or because of the production of sufficient fibrous tissue about the foci to prevent the absorption of foci poisons.

### CONCERNING THE PROPHYLACTIC VALUE OF TUBERCULIN.

Has tuberculin any prophylactic value against tuberculosis? As previously stated its discoverer Koch thought it had and electrified the world by his announcement. We now know that the great bacteriologist was mistaken. An enormous amount of experimental work has been done along this line, but with the exception of the claims of a few investigators and the slight evidence that the insoluble tuberculins like T. R. and B. E., in which the dead bodies of the bacilli exist in suspension, may engender a slight degree of immunity to later infection, an overwhelming preponderance of evidence is against the assumption that Koch's old tuberculin confers an immunity against living virulent tubercle bacilli.

### THE CURATIVE ACTIVITY OF TUBERCULIN.

Has tuberculin a curative value—that is, is the tuberculin reaction curative? Can the allergic tuberculin shock reaction redound to the benefit of the tuberculous individual? This has been and continues to be a question of vital importance, calling forth an enormous amount of clinical and laboratory investigation and a vast literature.

We have seen that the tuberculin reaction is accompanied by the production of hyperemia and serous and cellular exudation. It is commonly believed that we recover from tuberculosis by the production of fibrous tissue around the foci. The thicker and denser this capsule, the more complete is clinical recovery even though the capsule may enclose living bacilli. The cutting off of blood and lymph supply to the focus by this fibrous capsule gradually results in death and liquefaction of the contents, including the bacilli. Anything favoring the development of this capsule is, therefore, therapeutically advantageous.

Has the tuberculin reaction this effect? According to Kraus, who has studied this problem with particular care, it has. It is a well-known principle of pathology that chronic passive congestion is followed by fibrosis. Tuberculin in proper dosage and spacing of injections can elicit a series of mild allergic shocks about the focus of disease maintaining a more or less constant degree of hyperemia. Evidence indicates that this is followed by fibrosis, and fibrosis is greatly desired. Therefore, in chronic tuberculosis where the lesions are localized in a certain organ or organs, the administration of tuberculin is advantageous. In miliary and disseminated tuberculosis it may not be, or at least its curative effects may be too slow to prove of benefit.

The great mistake made in the early days of tuberculin therapy was the administration of too large amounts. These large doses produced profound and injurious focal reactions with the absorption of enormous doses of foci poisons, with disastrous effects—the lamentable days of the tuberculin delirium, from the impressions of which both the profession and the laity have not yet fully recovered.

I believe that tuberculin has a very definite place in the treatment of some cases of tuberculosis and especially those of a chronic and localized character. But the doses must be small enough and so spaced that the degree of focal reaction is mild but more or less continuous. The physician administering tuberculin should possess a good working knowledge of its effects, its potencies for harm and good; the beneficial results are not sudden or spectacular but slow and plodding. Patience and skill are required, and especially the patience to give a long series of subcutaneous injections and skill in judging the correct dose. In general terms the latter is judged according to the amount of absorption of foci poisons because the hyperemia cannot be seen in the internal organs; the degree of constitutional effects should be slight, as shown by only a degree or two of febrile reaction and minor other effects. Finally it is very difficult to express the effects by percentages of cures; individual cases in the practices of physicians may not have been benefited, but the effects of mild allergic tuberculin shocks appear to be favorable in that they aid in the production of fibrous tissue, and I believe suitable patients should always have the possible benefits of this process.

# The Conservative Treatment of Eclampsia

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Those forms of treatment are most rational and successful which are based on the pathology of the condition for which treatment is indicated. Recent studies in the pathology of eclampsia illustrate this principle of medical practice.

It has for some time been believed that the toxemia of early pregnancy, which so often shows itself in pernicious nausea and vomiting, is caused by the absorption of fetal elements from a growing embryo. Masses of syncytium and chorionic villi, carried into the maternal circulation, give rise to minute emboli and thrombi, which, carried into the vessels of the large blood-containing organs, produce pernicious nausea and its results.

Recent studies in the pathology of the placenta in cases of eclampsia indicate that a similar process is at work in the later months of pregnancy. From the placenta are isolated lipoids and proteid ferments which produce convulsions when injected into pregnant animals, and some of which have a selective power in attacking and destroying the secreting cells of the liver. The tubules of the kidney are also attacked by these bodies. Their action persists in the body of the mother for thirty-six hours after the uterus is emptied, and the act of separating the placenta sometimes greatly increases the virulence of their action. The toxemia of late pregnancy, with or without convulsions, is caused by the failure of the immunizing substances in the mother's blood to counteract and destroy these poisons. When the mother reaches the state of fulminant toxemia in late pregnancy, the poison is so widely spread through her body that the emptying of the uterus itself will not invariably check the process and save the mother.

The medical profession has passed through various stages of belief and treatment regarding eclampsia. Like diphtheria, at one time every known and some unknown drugs in the Pharmacopœia were used with the hope of success. Those patients who were very sick died in spite of drugs; those patients who were not very sick recovered in spite of drugs. Then came the belief that as this condition arose only in pregnant women it was our duty to end the pregnancy as rapidly as possible, and acting upon this the cervix was cut or stretched open and the child forcibly extracted. Again, those women who could stand the disease plus the treatment recovered. Those who could not died. Cæsarean section was considered a great advance, but the indiscriminate application of Cæsarean section gave the same results. Those who could stand the disease plus Cæsarean section recovered; those who could not died. Latterly attention has been turned to the so-called conservative treatment of these conditions.

The use of the word conservative is a familiar example of the fact that words are most successfully used when they conceal ideas. The physician who prides himself upon his conservatism does so because he believes that it is something different from the practice of the majority of his fellow practitioners, because of his greater wisdom and skill. True conservatism consists in saving life and health by whatever means is best, and hence there are times when a prompt and properly done operation is the highest degree of conservatism.

In no condition brought to the attention of the physician is prevention more important. In the present stage of our ignorance it is believed that blood-pressure or pulse-tension is a sign of especial value. A healthy pregnant woman will have a blood-pressure or pulse-tension of 110 to 130 mm. In his experience, the writer has found that where blood-pressure taken several times is 140 the patient's diet should be strictly regulated, the urine examined each week, and the patient seen once each

week. Where the pulse-tension rises to 160 the patient should be put to bed in charge of a competent nurse and vigorous treatment instituted. Where the blood-pressure or pulse-tension is 180 or above the patient should be sent to hospital as soon as possible; active treatment should be instituted, and unless this is promptly successful the pregnancy should be terminated. In taking blood-pressure with pregnant women it must be remembered that they are easily excited. It is well to make this test after sufficient time has elapsed to allow the patient to become somewhat accustomed to examination. In cases in which close watch is required, a blood-pressure chart should be kept, and if possible the daily amount of intake and output of fluid recorded.

In the absence of competent laboratory examinations the physician will do well to rely upon his clinical observation of the patient. The condition of the skin, of the pupils, of the tongue; the character of the heart-beat, the heart sounds, the condition of the abdomen, the presence or absence of substernal pain and tenderness at the epigastrium; the presence or absence of distention with gas and the general mental state of the patient; the presence or absence of frontal headache, and the condition of the vision, are all of importance.

To be of value the examination of the urine should be made of the twenty-four-hour specimen. Chemical examination for serum albumin, globulin, and a nitrogen partition of the urine are required. It is important to know the presence or absence of serum albumin, globulin, the acetone products, ammonia, rest nitrogen, and the percentage of urea. Microscopical casts, their number and character, and the presence or absence of blood, are significant. An estimation of blood urea should accompany the examination of the urine.

The clinical history of these patients is difficult to obtain accurately, unless the patient is in charge of a nurse or in a hospital. Records made by the patient herself are usually without value, and the description of her symptoms is generally inaccurate. When she is very sick it is apparent. The physician's records, however, whether made at his office or at the home of the patient, should include the condition at the visit, and such records should be transferred to office records.

There is no way of definitely knowing that a patient is growing better or worse except by personal observation and examination. A brief change in the condition of the urine is not sufficient evidence upon which to base the belief that a patient is considerably better or worse. All the symptoms and the general feeling of the patient must show a marked change for the better if a substantial improvement has been recognized.

When a patient grows worse the symptoms are aggravated and steadily increase in intensity. Some of the most severe cases develop suddenly. Such begin with severe pain in the epigastrium, nausea and vomiting, violent headache, disturbance of vision, and great prostration. This is termed by some eclampsia without convulsions. In many cases epileptiform convulsions known as eclampsia develop.

Concerning these, it must be remembered that they result from irritation of nerve centers by poisoned blood. They resemble elevation of temperature after operation or in the presence of infection. This we take as an evidence of resistance, and we are more anxious about patients who, in the presence of disturbance like operation or infection, have a normal or subnormal temperature. So eclampsia is the resistance of the patient's organism to excessive blood poison. The convulsions produce intense muscular activity. This is followed or accompanied in most cases by sweating, often relaxation of sphincters and the emptying of the bowel and urinary bladder. In some cases labor is brought on. It is significant to remember that a woman may have convulsions without the interruption of her pregnancy, and that a healthy child may subsequently be born. The worst cases of toxemia have no convulsions, while a woman has survived more than one hun-

dred successfully. So far as the management of convulsions is concerned in the present stage of our ignorance, it has become a simple matter. Inhalation anesthesia is to be avoided, because of the danger of pulmonary edema. The hypodermic use of morphine is now considered the best treatment. Care should be taken to keep the patient from biting the tongue, to promote the discharge of mucus and saliva from the mouth and nose, and to keep the patient's face as clean as possible.

The essential element in the conservative treatment of toxemia, with or without eclampsia, is elimination. In a case calling for the most active treatment, copious irrigation of the stomach with hot bicarbonate of soda solution, five or ten grains of calomel with bicarbonate of soda for absorption; irrigation of the bowels with two gallons of warm salt solution; patient in bed between blankets—all are indicated. The patient should be catheterized at regular intervals and the urine examined. Repeated irrigation of the bowels as often as every four hours is exceedingly useful. Repeated irrigation of the stomach is not necessary, unless the patient vomits. The quantity of morphine necessary to control the patient is reduced considerably by the relaxing effect of the treatment by lavage. In very profound toxemia, with or without high blood-pressure, from 8 to 16 ounces of blood should be taken from the arm and from 12 to 24 ounces of sodium bicarbonate and glucose introduced. This is best done by exposing the vein and using a cannula. In unconscious patients no difficulty is experienced, but with those who are conscious the skin may be infiltrated to secure anesthesia.

No interference with the uterus should be practiced, unless the patient endeavors to expel the child and needs help to do so promptly; then the use of forceps or rarely version is indicated. Ether and oxygen is the anesthetic of choice, and if morphine is used little anesthesia will be required. It is well at the conclusion of anesthesia to irrigate the stomach thoroughly.

Delivery by section, abdominal or vaginal, is indicated only in a vigorous primipara at term with child in good condition, who has had few severe convulsions and in whom the cervix is not shortened nor softened nor dilated. Prompt operation, accompanied by bleeding and transfusion and lavage of the stomach, and often by copious irrigation of the bowels, may save the life of mother and child.

In a patient who has been under the care of a physician and in whom the condition of toxemia has developed gradually, when the progress of the disease cannot be checked, the pregnancy should be interrupted. Caution may here be given against the use of nitrous oxide and gas in patients suffering from severe toxemia early or late; it is to them very depressing, and a fatal result has followed.

If one is to practice the conservative treatment of toxemia and eclampsia, one must remember that the danger is not over when convulsions cease, the patient becomes conscious, and the uterus is empty. She will be in peril for from two to three weeks longer. Edema of the lungs, rapidly developing insanity and death from fatty degeneration of the heart or from cerebral hemorrhage may terminate her case fatally. In edema of the lungs and impaired action of the heart, strychnia, digitalin and atropine should be given hypodermically in a full dose. Dry cups over the lungs and an efficient purge, which is not a saline, and limiting the amount of soft food, without much fluid, and sufficient morphine and atropine to secure rest, are indicated. For acute insanity, elimination, restraint, sedatives and careful feeding are needed.

Advantage is sometimes gained by reenforcing the blood serum of the mother by hypodermic injections of sterile horse serum 20 cc four times daily.

The conservative treatment of the mother will give the child its best chance. After birth it is exposed to the same dangers of toxemia and convulsions which threatened it while in the uterus. A similar treatment, modified in accordance with weight and vigor of the infant, should be adopted.

The conservative treatment of toxemia and eclampsia may be summarized as follows:

Do no harm by rapid, violent and forced delivery, which opens fresh channels for thrombosis, embolism, and infection. Modify the violence of convulsions, cause the mother to eliminate as promptly as possible, if necessary removing poisoned blood, but replacing it with glucose and sodium bicarbonate solutions. Repeated thorough elimination through the bowels is of especial value. Help labor, but do not start it. Occasionally, as indicated, perform abdominal Cæsarean section promptly. Make no predictions concerning the recovery or death of a patient. Do not pronounce her out of danger until between two and three weeks have passed after the termination of pregnancy. As the child is probably as diseased as the mother, do not risk the mother's life to save the child. Treat the child in proportion to its strength and weight as you would the mother.

What will be your success? In the prevention of serious toxemia and eclampsia, including the induction of labor where the patient commences to grow worse, you will reduce the mortality among these patients to less than 4 per cent. A corresponding reduction in the mortality of the infant will follow. In cases of violent toxemia and eclampsia, treated in hospital in the manner described, you may have a series of 20 to 40 cases without a death, and lose the next five cases under the same treatment. In general this treatment in hospital in severe cases should have a mortality of less than 10 per cent for the mother and less than 50 per cent for the child.

Whatever else you do in the management of such a case, give no depressing drug; no matter whether it seems to relax the blood-vessels of the patient, or for the time being lessen the violence of convulsions. For this reason pilocarpine and veratrum viride, in the experience of the writer, are not used.

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# Dibromin

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Many female patients who consult the urologist present certain local conditions that require a well-selected daily toilet. This adds much to the comfort of the patient and in many instances has a favorable influence upon the pathological condition present. Free drainage is always a factor of prime importance. For this reason I have adopted the plan of freely douching with warm aqueous solution, avoiding the addition of irritants or anything that would interfere in the least with nature's effort to rid herself of foul discharges.

I have recently made some interesting observations in attempting to outline a rational treatment for these cases. Plain sterile water at proper temperature has both a palliative and cleansing effect, but the presence of pathogenic bacteria presents a distinct indication for the addition of a germicide. A number of different chemical agents have come into more or less favor, but most of them have some distinct objectionable features, among the most prominent of which are lack of germicidal activity, irritation, and discoloration, any one of which would be disqualifying.

My attention was recently directed to dibromin, a new bromide compound that seemed to possess the necessary germicidal requisites. A series of 225 cases, including metritis in young women, tubal catarrh, leucorrhea, and vulvar pruritus, were treated. These cases were not selected from any

special group, but treated as they presented themselves. In each case the patient was given daily douches of two pints of dibromin solution 1:15,000. Soon after these douches were applied the character of the discharge was changed to a less purulent condition and a considerable loss in odor. This treatment has a cleansing effect and showed a marked influence upon the bacterial flora of the parts irrigated, with an absence of any trace of irritation. Furthermore, the solution being perfectly water clear, there was no soil or stain to any of the patients' garments or dressings. This is a very important thing to consider in connection with the treatment of all female patients.

The gratifying results in the use of dibromin solution in this group of cases stimulated an interest in the chemistry of this product in attempting to learn why we are able to obtain a decided germicidal action with no harmful toxic or irritating effect. It is a well-known fact that bacteria are very susceptible to the oxidizing effect of such preparations as peroxides, iodine, and the various derivatives of chlorine.

Dibromin is a pure chemical substance (dibrom-malonyl-ureide) and has the formula $C_4Br_2N_2H_2O_3$. It is a crystalline substance, white in color, odorless except for a faint suggestion of bromine, and does not possess an objectionable taste.

Chemically dibromin is of interest because it has been found to be an oxidizing agent. All oxidizing agents are destructive in their action upon organic matter and are naturally destructive to the delicate bacteria. It is an unusual thing to discover an oxidizing agent which will act destructively on bacteria and at the same time show little or no effect upon animal tissue, and also be devoid of other objectionable properties, such as toxicity, odor, color, stability, taste, etc.

Dibromin owes its oxidizing and bactericidal value to the bromide which it contains in chemical combination to the amount of 56 per cent. The entire amount of bromine (56 per cent) is available for oxidizing purposes, and in the chemical process involved dibromin gives up its bromine.

Notwithstanding its very high content of available bromine, dibromin is a perfectly stable substance in crystalline or solid form when kept dry. The solubility of dibromin in water is between 3 and 4 per cent. The solutions in water are stable for at least one week and should not be used after this time. The water solubility of dibromin (3 to 4 per cent) is amply sufficient for the preparation of any strength solution required for surgical purposes.

The great majority of chemical substances which have been employed as germicides or antiseptics unfortunately also possess other properties which seriously limit their efficiency for use on the living body.

The literature on the use of antiseptic solutions, such as Dakin's solution, Carrel-Dakin's solution, chloramine-T, etc., shows that they owe their germicidal value to chlorine, but also that they all have certain characteristics which very materially limit their usefulness, such as difficult and involved processes of making the solution, rapid decomposition, highly irritating qualities, etc. The various dyes, such as acriflavin, brilliant green, and the like, have also been somewhat disappointing, although they are strong antiseptics.

Laboratory investigations show the following coefficients of a group of disinfectants to five pathogenic organisms:

COEFFICIENTS.

| | Pyocyaneus. | Streptococcus Hemolyticus. | Staphylococcus Aureus. | Diphtheria. | Pneumococcus. |
|---|---|---|---|---|---|
| 1. Phenol | 1 | 1 | 1 | 1 | 1 |
| 2. Dibromin | 111 | 213 | 100 | 80 | 47 |
| 3. Acriflavin | 24 | 12 | 1 | 131 | 7 |
| 4. Iodine | 111 | 55 | 173 | 84 | 100 |
| 5. Potassium Permanganate | 54 | 17 | 16 | 37 | 100 |

In comparing the phenol coefficient of dibromin with acriflavin, iodine, and potassium permanganate, it can be readily understood why the local infections promptly yielded to repeated irrigation in the series

of cases we have had under observation. A compound that gives so favorable an account of itself clinically and offers so much from laboratory investigations seems destined to fill a valuable place as a much-needed non-toxic, non-irritating, non-staining, highly potent germicide that is comparatively stable and readily soluble in water.

486 RUE ST. DENIS.

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# Note on Intestinal Infection and Disinfection

BY DAVID WALSH, M.D. (Edin.)

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During the past thirty or forty years the subject of intestinal disinfection has forced itself more and more upon the attention of the practical physician. That result followed inevitably from the discovery of the germ origin of many human maladies, and from the further fact that a large group of multiform symptomatic troubles were gradually associated with microbial bowel infections. What could be more logical than the attempt to destroy *in situ* the harmful bacteria at the root of the mischief? Many drugs have been used for this purpose, but none have been so far more than partially successful. The physician, foiled in his attempts to destroy the source of infection in the intestines, turned his attention to the indirect method of neutralizing the secondary toxemia formed by absorption of toxins into the body proper.

In some cases brilliant results followed the use of curative and preventive vaccines and sera but in others bacteriotherapy has proved disappointing. Nor have ordinary drugs been found of much value, although the scientific chemist has now and then scored a great triumph by the introduction of synthetic drugs such as salvarsan and atoxyl, which destroy living organisms in the tissues without being toxic to the host. In the present article it is proposed to deal briefly with a comparatively recent chemical remedy that claims to satisfy the requirements of an ideal intestinal disinfectant.

Needless to say, any substance of this nature introduced into the alimentary canal has to encounter many vicissitudes in the shape of various chemical, putrefactive and fermentative processes during its passage through the long and complicated gastro-intestinal tube. The requirements of such an agent have been tersely summed up by Assmann[1] as follows:

1. It should have a strong germicidal action.
2. It should be relatively non-toxic for the body as a whole, and harmless to the intestinal mucosa.
3. It should not be absorbed.
4. It should suffer no chemical change whereby it loses any of the above requirements.
5. It should be so constituted that it mixes freely with the intestinal contents, and therefore be freely soluble.

Leaving this part of the subject for the time being, let us consider briefly certain microbial infections of the alimentary canal and the associated toxemias to which their absorbed toxins give rise. Of direct infections of the gastrointestinal mucosa, good examples are those of enteric fever, summer diarrhea, cholera, and bacillary dysentery. There are, of course, a variety of other affections of this type, recognizable by such symptoms as abdominal pain and tenderness, vomiting, bowel disturbances, and fever. For our present purpose there is no need to discuss in detail this interesting group of direct microbial infections of the alimentary canal; it is evident that,

[1] *Ztschr. f. Tiermed.*, 1911, xv, 122, 264, 352.

armed with an ideal antiseptic, we should be able to destroy the offending organism throughout the length of the bowel.

The rôle of the bowel antiseptic is clearly confined to affections of microbial origin; there are a number of intestinal irritants of animal, vegetable and mineral origin that would be outside the range of a disinfectant. The lower part of the bowel, again, may become inflamed by the excretion of an irritant, either absorbed from a higher part of the gastrointestinal tract or otherwise introduced into the system *(e. g.,* the inunction of castor oil acting as a purgative), but even in such a case the inflamed mucosa might be saved from further microbial invasion by the presence locally of an efficient antiseptic.

The next point to consider is the alimentary toxemias, or abnormal states of the blood due to absorption of toxic substances from the intestines. One of the earliest conditions of the kind to be recognized was the familiar form of anemia known as chlorosis or yellow-green sickness, met with in young constipated females. This well-marked malady, with its absolute reduction in hemoglobin, may safely be attributed to toxic absorption from the bowel. A wider recognition of the morbid association of bowel toxins with systemic troubles was made by the famous French physician, Professor Bouchard. In his lectures upon Autointoxication, published in book form in 1887, that great observer dealt with poisons generated within the body, notably, and, above all, with those absorbed from the alimentary canal.

To illustrate his views he cited the case of gastric dilatation. On the side of the tube he mentioned gastritis and gastro-intestinal dyspepsia; on the side of the body generally he cited such symptoms as disorders of sense and of intelligence, skin affections, catarrh of mucous membranes, albuminuria and peptonuria, inflammation of various tissues and phlebitis, deformity of phalangeal articulations; and so on. In the then existing stages of knowledge this list was not a little remarkable, especially as he added rachitis and osteomalacia to the morbid results associated with gastric dilatation.

Of late years much additional light has been thrown on the field so brilliantly opened up by Dr. Bouchard. What he achieved was without the aid of our modern knowledge of such matters as immunity, anaphylaxis, organotherapy, vaccinotherapy, blood diagnoses, and chemotherapy. These and kindred advances have considerably widened our conception of cause and effect in all kinds of autointoxication. As pointed out by Professor Hewlett:[2] "The morbid effects of alimentary toxemias are very varied, ranging from slight departures from normal health to serious diseases, such as arteriosclerosis, renal disease, exophthalmic goitre, and intestinal sepsis requiring operation."

In other words, the secondary toxemias arising from the absorption of toxic material from the bowel are multiform, of varying degree, and may attack practically any tissue in the body, each tissue or organ reacting in its own way. The brunt of the mischief shows itself at first more particularly in the vascular system, and in the organs concerned in excretion. A vicious circle is completed by the subsequent anemia, accumulation of waste products, failure of digestion and nutrition, with various degenerations, especially that of the heart-muscle, whereby the circulation is enfeebled and bodily resistance correspondingly lowered. The nervous system suffers in many ways: headache is a common symptom and varies from a fleeting pain due to a circulating toxin in the blood-stream to the severer forms associated with cerebral anemia or degenerative changes.

It is evident that alimentary toxemias may give rise to a number of symptomatic maladies—probably to more than have hitherto been suspected. Amongst its indirect results not the least important is the lowered resistance of the body generally, a negative phase that encourages a "flare-up"

[2]Introductory note to brochure on "Intestinal Disinfection," by Capt. Ainslie Walker, R.A.M.C.

of lurking germs that have been hitherto inhibited under conditions of normal health. Take the case of influenza, which, in an attack of gastric type, may reasonably be regarded as a specific infection of the alimentary tract, as shown by the attendant local pain, vomiting, and diarrhea. There is a considerable diminution of white corpuscles at the outset of the attack, and complications may ensue from the development of activity in associated organisms, notably those of pneumonia. Where the influenza enters by a respiratory route, the course of events is probably of a similar nature—*mutatis mutandis*. The toxin not only reduces the white cells of the blood but attacks other tissue-cells, especially those of heart-muscle and the muscular system generally. This action of the toxin, according to Ehrlich, is purely chemical, inasmuch as it unites with a cell because some chemical group in its molecule has an affinity for some other group in the cell protoplasm.

The general view of an alimentary toxemia is that it is caused by the absorption of microbial toxin, pure and simple; but the process may be complicated at times by the passage of actual microörganisms through the wall of the bowel. Certainly in the case of enteric fever the *bacillus typhosus* is often excreted in the urine and found in various parts of the body. In other words, the pure toxin phenomena may be complicated by the addition of a bacterial invasion.

Another source of non-bacterial absorbable toxins exists in the products of digestion, many of which are toxic, but are not absorbed. If the mucosa becomes inflamed as the result of some specific inflammation, it is not improbable that some of the toxic products of digestion may pass through the mucosa.

On the whole it seems to the present writer not unlikely that the alimentary toxemia probably results from a *cumulative* process. Take the analogous instances of jaundice and uremia, in both of which there is an accumulation of a toxin produced in excess, and presumably associated with more or less failure of excretion. In much the same way one may imagine constipation setting up a toxemia by furnishing continuously toxic products of putrefaction which are absorbed and accumulated in the system. Nor does it seem difficult to explain how both toxins and bacteria could effect a passage through the bowel under such circumstances. For some reason or other the healthy intestinal mucosa is proof against the passage of toxic substances. Prolonged distention of the bowel by feces and gas, however, would tend to interfere with the local blood supply. This failure of a vital defensive agent would in turn expose the cells of the bowel wall to damage from the putrefactive toxins, with corresponding damage to function. In this way the defensive wall would be effectually breached.

Without pursuing further the pathology of the alimentary toxemias, it may be assumed that a very large number of ailments, some of them of a serious nature, may be ascribed to that origin.

Now it is clear that if we have an ideal intestinal antiseptic, we can kill the organisms in the bowel and so put an end to the invasion: and where there is a chronic slow process of cumulative intoxication, we can equally well cut short its power of mischief. Have we such an agent? Happily, there is reason to believe that modern chemistry has at length furnished the ideal intestinal disinfectant which both surgeons and physicians have sought in vain for many years past. Captain Ainslie Walker, the well-known bio-chemist, has produced an agent of the kind that apparently fulfils all the requirements demanded by Assmann as an ideal standard. Speaking of his discovery, the *Lancet*[1] says:

"The claims made for this new intestinal disinfectant are put forward on the favorable clinical experiences of specialists in this country and in the United States. . . . It is possible to destroy all bacteria in the intestinal tract with a duodenal douche, but the dosage recommended in the form of tablets or pulverettes (2 to 4 after each meal) is so regulated that the *B. coli* nor-

[1]The *Lancet*, April 9, 1921.

mally present are not affected, a fact that can only be ascribed to their greater powers of resistance."

The therapeutic disinfectant in question is an improvement upon another benzene derivative previously prepared by Ainslie Walker under the name of "Trimethol." After prolonged chemical research its therapeutic value was established. It has since been replaced, however, by a more efficient product to which the name of "Dimol" has been given. It is described scientifically as dimethylomethoxyphenol, $C_6H_2(CH_3)_2.(OCH_3).OH$, in combination with the tri- and tetramethylophenols.

This preparation has a strong bactericidal action. It is thirty-five times more efficient in that respect than pure phenol, a fact substantiated by the standard Rideal-Walker test. Other important qualities are supported by the high authority of the *Lancet*,[2] as follows:

"The chemical constitution of dimol reveals the presence of a phenyl radical, but this is not split off in its passage through the intestines. In other words, dimol is voided in the feces, unchanged. Examination for phenol in the urine after a week's course of treatment gave a negative result. Tests made for us confirm a coefficient of 35.0 and the freedom from toxicity claimed by the manufacturers."

The limits of the present article do not allow the production of clinical evidence in support of this remedy. Suffice it to say that in England it has secured the approval of such distinguished authorities as Prof. Lovell Gulland of Edinburgh University, Prof. Dixon of Cambridge University, Sir William Arbuthnot Lane, Dr. John Eyre, Dr. Eric Pritchard, Mr. Lockhart-Mummery, Mr. Peyton Beale, and many others. In the United States its value has been indorsed by numerous observers, including Drs. Dudley Roberts, Muttart, DeGraw, Doescher, Ferrar, Beveridge, and Bishop.

At some future time the author hopes to publish his own clinical experiences with this remedy in influenza and gastric ulcer, osteoarthritis, and certain skin affections, more especially those of the scaly and the urticarial types. Enough has now been said to draw the attention of the medical profession to a subject of engrossing importance. Should the claims of this intestinal disinfectant be sustained, Medicine will be presented with a weapon of inestimable value in the warfare against many hitherto more or less obscure and intractable maladies.

[2]The *Lancet*, *loc. cit.*

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### Amebic Liver Abscess.

ROGERS, in the *British Medical Journal* of February 18, 1922, states that while his method of repeated aspiration, combined with specific medical treatment, was the method of election, he believes that in exceptional cases another procedure might be desirable. Even in those exceptional cases in which drainage was found necessary, however, after one or two preliminary aspirations, both the size of the cavity and the amount of discharge would be less than if the abscess had been opened immediately, so that nothing was lost and much might be gained by evacuation of the pus.

In one case at the first aspiration 86 ounces of typical pus were removed, quinine solution was injected, and ipecacuanha given orally. Within a week this patient died unexpectedly, and the post-mortem examination revealed apical pneumonia, quite unconnected with the liver trouble. On examining the liver abscess cavity it was found to have so contracted as to contain only 2½ ounces of thin fluid, and its fibrous wall measured almost half an inch in thickness.

He has records of complete recovery after 120 ounces had been aspirated at a single sitting. One case was that of an emaciated Indian, who had been ill for a year, and who made a perfect recovery after a single aspiration and injection of quinine solution into the cavity, and the administration of ipecacuanha orally.

He describes a method of drainage which he had worked out so that when this measure was necessary no air could enter the abscess cavity and secondary infection might be prevented. He also referred to a

trocar with a flexible sheath which is left in the abscess as a drainage tube, and could be connected by a long tube to a vessel containing an antiseptic lotion. With increasing success with the aspiration and emetine treatment, however, this method of sterile siphon drainage was of comparatively less importance. At the same time it had advantages, especially in bringing about rapid healing.

He instances a case of liver abscess treated by siphon drainage in which a preliminary aspiration of about ten ounces of pus was made through an intercostal space, and siphon drainage applied by means of a tube, the distal end of which was carried into a bottle containing antiseptic. The pus obtained at the operation proved to be sterile. At the end of the first day a few ounces of pus had drained into the bottle, the discharge was much less on the second day, and on the third morning only a little shreddy pus had drained away, and the cavity had contracted so much that the quinine injection could hardly be got in. Within a week the sinuses were soundly healed and the patient left the hospital. A year later the liver was still quite normal. The stay of this patient in the hospital was less than half the shortest time of any liver abscess case in which operation had been carried out by incision through the thoracic wall.

Nature's methods of cure of amebic liver abscess were twofold: bursting of the abscess and encystment. The abscess might increase in size until it burst in one or other direction. In some cases this resulted in recovery without surgical interference, as when it burst into the stomach or colon; the common extension through the diaphragm into the bronchus showed a recovery rate of over 50 per cent. Cases of rupture into the peritoneal cavity were commonly fatal. The other method of nature's healing was by encystment, with dying out of the amebic infection. This was less uncommon than might be expected. There were seven instances among the Calcutta post-mortem records of cases dying with other diseases in which this state of affairs had been found. In one instance he found an abscess which had been opened and drained during life containing both amebæ and bacteria, a second containing amebæ only, and a third encysted, without either organism. The liver abscess became encysted with emetine treatment, and he claims that his method of repeated aspiration and injection aided this effort at encystment of the abscess by destroying the protozoal parasite in the walls and by removing the detritus. The method was, therefore, as sound in principle as it had proved to be successful in practice. The danger of hemorrhage after exploratory puncture had often been remarked, but it appeared that the greatest tendency to fatal hemorrhage was in the acute hepatic congestion of the presuppurative stage of the disease, and therefore such a puncture should not be done in any case in which liver abscess was suspected without first treating the patient by medicinal means, to which the hepatitis at this stage was very amenable.

He then refers to a table in which he compares the mortality of liver abscess treatment by open operation with that of treatment by repeated aspiration and injection. The great majority of the cases in the first group were from British army records, extending over fourteen years up to 1907, in India. Of 2661 cases treated by open operation the deaths numbered 1311, or 56.7 per cent. The other group consisted of 111 cases:

| | Cases. | Deaths. |
|---|---|---|
| Rogers at Calcutta (first series)..... | 19 | 3 |
| Thurston in Bengal..... | 48 | 11 |
| Chatterji in Calcutta..... | 33 | 2 |
| Talbot in Mesopotamia..... | 11 | 0 |

This gave a mortality of 14.4 per cent, or one-fourth of the mortality by the other method. At the London School of Tropical Medicine 12 cases had been treated without a death, but these cases were less acute than those commonly met with in India.

# Editorial

## THE TREATMENT OF INTRACRANIAL BIRTH HEMORRHAGE.

Every practitioner is aware of the fact that a certain proportion of children who die shortly after birth pass away as the result of intracranial hemorrhage which is induced either by poor blood-vessel development or by the use of instruments, or the unwise use of pituitary extract or ergot in the early stages of labor. The hemorrhage arises from the longitudinal sinus or the veins which supply it, or the transverse sinus, or as the result of tearing of the tentorium with extravasation of blood over the cerebellum. So, too, there may be rupture of the vessels of the choroid plexus with the blood filling the ventricle.

A certain proportion of these children unfortunately survive, and if so are prone to develop epilepsy, spastic paralysis, idiocy, or imbecility. Naturally the question has arisen as to whether they can be relieved in any way. The methods of relief suggested have been operation upon the cranial contents, but this means in the majority of instances that no such effort is undertaken until the symptoms of cerebral damage have been present for a long period of time, and be the operation successful as it may, the damage to the intracranial tissues is then incurable. It is manifest that if anything is to be done, it should be attempted very shortly after the birth of the child and the development of the symptoms, which indicate that such an accident has occurred. For this purpose, intraspinal puncture may be resorted to. By this means it is possible to relieve intracranial pressure and to actually draw off at least a part of the extravasated blood, except in those cases in which the hemorrhage is above the tentorium. A very considerable number, however, are below the tentorium.

The possibility that this effort may be rewarded by success is increased by the fact that coagulation of the blood inside the skull is delayed.

Root has contributed an interesting article on this subject to the *Archives of Pediatrics*, pointing out that when there are convulsions after birth or muscular tremors, cyanosis, stupor, positive Kernig sign, spasticity, nystagmus or strabismus, a bulging fontanel, slow and irregular pulse, irregular breathing, and contracted, fixed or unresponsive pupils, hemorrhage is present. These symptoms may not develop for some days. He reports cases in which spinal puncture has been of very material benefit, directing that it shall be performed daily for several days until the cerebrospinal fluid is clear; from 5 to 10 cc of the bloody fluid being removed each day.

Root also quotes a number of other clinicians who have resorted to this method with advantage, calling attention particularly to the investigations of Sharpe, who has shown that where there is a bulging fontanel and positive ophthalmoscopic indications of increased intracranial pressure, a manometer attached to the needle may show a pressure of 15 mm., whereas the normal pressure of the child should not be above 2 to 5.

In Root's experience there have been six cases: two were in a critical condition and promptly died; the result in one case is in doubt; in the other three there was complete recovery, and it is a noteworthy fact that immediately after the performance of the puncture the child slept quietly and all symptoms of spasm ceased, he nursed strongly; and at the time of the report twelve months later the child was normal, mentally and physically, in every way. In this case only one effective puncture was utilized with the withdrawal of 3 cc of pure blood. As the second tap was dry and the child was rapidly improving, further instrumentation was considered unnecessary. In still another patient, seen two days after birth, the child having been delivered by high forceps and suffering from convulsions at intervals of from ten minutes to half

an hour, with negative pupils and rapid respirations, rigidity of the neck and a positive Kernig sign, lumbar puncture was performed and almost pure blood was obtained which clotted in the needle and required the introduction of a larger instrument. At first 5 cc of blood-red fluid followed the use of the larger needle, and then 6.5 cc was obtained which was evidently more dilute. The symptoms all ameliorated. Puncture the next day resulted in a dry tap, and a month later the child was doing very well except for facial palsy due to the direct influence of the forceps.

While in many cases the damage to the intracranial tissues is so great that such a method of treatment is obviously futile, nevertheless we think that this plan should be tried since it is evident that in some instances it may produce excellent results. Naturally the greater the delay the less the chance of spinal puncture being followed by good results.

## LEVULOSE AND THE LIVER.

As all of our readers know, great advances have been made in the last few years in connection with our knowledge of the functions of the kidneys, not only from the standpoint of clinical investigation, but also from the pharmacological laboratory under the guiding hand of Richards. Much investigation has also been carried out concerning the function of the liver. In each instance it is evident that a very large field is still to be explored, and this is particularly true of hepatic function, for while we know that the liver is actively concerned in the secretion of bile and in the storage of glycose, we only have dim conceptions of its functions along other lines which are probably equal if not more important.

More work has been done in England upon hepatic function in the last few years than in this country, whereas the reverse holds true in regard to the studies upon renal function.

In a recent issue of the *Lancet*, Spence and Brett bring forward the use of levulose as a test for hepatic inefficiency, pointing out that it has been extensively used in the past by Strauss and various others, but that the results obtained by Strauss, and those who have followed him, have seemed to be so unreliable as to make his method of little value. Strauss' method consisted in the administration of single large doses of levulose and then testing the urine to discover whether it appeared in quantities which would indicate that the body could not store it, with special reference to the storage capacity of the liver. It has been pretty well shown by a number of investigators that this is not an adequate test since it brings into play the factor of the renal threshold, which if low may permit levulose to escape and if high may result in undue retention. On the other hand, it is evident that an estimation of blood sugar, or blood levulose, will give a much more accurate conception as to the ability of the liver to store this substance, and, bearing this fact in mind, Spence and Brett have not studied the elimination of levulose in the urine, but have studied the blood levulose curve with interesting results. Incidentally, they did not find that it was necessary to tap a vein and to thereby obtain any considerable quantity of blood, but on the other hand resorted to the microchemical method in which capillary blood is taken from a needle prick by means of a fine pipette. The method which they employed causes the patient to fast for at least three hours before the test is carried out in order to get rid of the influence of the preceding meal upon the blood-sugar content. It may be that more than three hours would be advisable, in some instances four or five being better. The first sample of blood for sugar estimation is taken immediately after the patient drinks the solution of levulose, and further samples at half-hour intervals for two hours. The quantity which they advise varies with the weight of the patient from 30 to 50 grammes, and while an exact proportion between weight of patient in kilos and grammes is not insisted upon, nevertheless they point out that as much as 100 grammes would be in excess.

They show in a very interesting way that

these tests with levulose have a very slight effect upon the blood sugar. In no case was there a definite rise of even 0.02 per cent. The average blood-sugar percentage ranged between 0.9 to 0.11. In other words, it would appear that the liver has an extraordinary ability to assimilate and store levulose as rapidly as it is absorbed. This, however, is not the case with glucose, which is so commonly employed in cases in which it is highly desirable that the liver shall be well stored with glucose, since when large doses of glucose are administered, corresponding in value to those of levulose, there is a very noteworthy increase of blood sugar so that the figures when charted show an abrupt rise of considerable proportions in the blood-sugar content, whereas when levulose is given the rise does not amount to more than 0.01 per cent.

These facts serve to confirm what we have long known, namely, that levulose is a sugar which is much better tolerated by the diabetic than any other nearly related substance.

Extending their investigations to conditions of the liver in disease, they chose instances of salvarsan jaundice with symptoms of anorexia and vomiting, in an endeavor to determine whether in such cases the abnormal condition of the liver seriously interferes with its ability to store the levulose, and this was found to be the case. A very sharp rise in blood sugar took place when standard doses of levulose were administered, and, furthermore, the rise was maintained at an abnormally high level for at least two hours. As they have established the fact that in a healthy adult with normal liver efficiency a dose of 50 grammes of levulose will not show an appreciable rise in blood sugar and that such a rise does occur when the liver is abnormal, they advise this method as one whereby liver efficiency can be determined. Furthermore they believe that the rise will be in proportion to the degree of hepatic impairment; or this test, to use their words, affords a means of estimating the degree of liver damage in cases of salvarsan hepatitis and other diseases of the liver.

The research does not, of course, determine hepatic efficiency so far as other functions of this gland are concerned. Probably most of our readers would be more interested in investigations along the latter lines than they are in the studies of Spence and Brett. Nevertheless any investigation which throws light into the obscurity which still exists in our knowledge of the activity of the liver has a direct bearing upon our knowledge concerning this most important gland and serves to guide us in our methods of treatment.

## THE MEDICAL TREATMENT OF PYLORIC STENOSIS.

Pyloric stenosis in infancy occurs not very frequently, and yet often enough for the busy practitioner to see an occasional case. Furthermore, the condition is sufficiently grave to destroy a large proportion of the children that suffer from it.

Various divisions of pyloric stenosis have been suggested, and some have thought that the only possible method of relief was by surgical interference, particularly when the rapid emaciation of the child, with the characteristic projectile vomiting, and the emptiness of the bowels, indicated that the stenosis was almost complete.

Recently Ernberg and Hamilton have made a contribution from the Sachs Babies' Hospital of Stockholm upon this subject, which is worthy of the attention of the general practitioner as well as the surgeon. They discuss 57 cases, 46 of which were boys and 11 girls. All presented the typical picture of pyloric stenosis. In these patients the symptoms developed at intervals varying from one week to eight weeks after birth. Thirty-eight were nursed at the breast. Of the entire number that were treated other than by surgical methods, only two died. Both of these may be said to have died from other causes.

The essential things in the medical treatment are the providing of the organism with sufficient water to prevent desiccation, the nourishment, if possible, with breast milk, and every endeavor to keep the surround-

ings of the child as quiet as possible. They used Ringer's solution by the rectum to the amount of 100 to 150 cc twice daily. Where there was great desiccation or where the rectal administration was not successful, they resorted to subcutaneous injection, and one of these methods was maintained until there was no longer loss in weight. In the majority of instances the injection was given daily for several weeks, sometimes as many as one hundred injections being used, and yet no evil results accrued. They believed that the desiccation of the tissues is the dominant factor in producing unfavorable results, although, of course, the matter of actual nutrition is an exceedingly important one. In addition to breast milk in some instances, they also gave one or two meals of buttermilk a day, the average number of feedings being six daily. The great advantage of the breast milk is the avoidance of infection, and this is the reason why isolation is not only to secure nervous quiet, but to protect from infection. They do not think well of gastric lavage, although in some instances they have seen it produce good effects. So, too, they have little confidence in atropine, cocaine, and other drugs.

Finally, these two authors point out that while surgical treatment may shorten the duration of the illness, such operation requires that a surgeon shall be specially trained in his work, and furthermore, there is the danger which is inherent to abdominal sections.

## PERFORATION OF THE NASAL SEPTUM IN COCAINE TAKERS.

We presume that a majority of our readers consider that perforation of the nasal septum is usually, if not always, due to syphilitic infection, but a careful study of this subject during the last few years has shown that such a conclusion is incorrect, and that a number of drugs or irritating substances are capable of producing this result. Thus it has been found to occur amongst workers in certain trades, as, for example, those who are exposed to arsenic, and a sufficient amount of evidence has been produced to indicate that perforation occurs in so-called "cocaine sniffers." It is true that some believe that the cocaine is taken because of the formation of a perforation which gives them a desire for relief. While this may be true in some instances, nevertheless in others the cocaine is undoubtedly the etiological factor; and as Crookshank of London points out, in a recent issue of the *British Medical Journal*, perforation of the cartilaginous septum is of sufficiently frequent occurrence in notorious cocaine takers to warrant our attaching some importance to the association of such nasal perforation to a certain group of general nervous symptoms.

Crookshank claims that the perforation in cocaine takers is always circular, and that it always occurs in the cartilaginous portion of the septum.

## THE OPERATIVE TREATMENT OF SIMPLE FRACTURE.

It will be remembered that Arbuthnot Lane has been for many years the high priest to those who believe that simple fractures should as a routine measure be treated by operation. It will be remembered that there was a wave of enthusiasm for this treatment which waxed for a period because few people died as a result, which waned thereafter because many people recovered neither so completely nor rapidly as they would have done had they been treated under simpler methods. With the waning of this enthusiasm there came a better appreciation of established and conservative methods, namely, position, traction, splinting, and joint movement. Lane *(American Journal of Surgery,* March, 1922) notes that in 1893 he started to operate in all cases of simple fracture when it was impossible to obtain accurate apposition of fragments by other means, and this where complete restoration of function was needful to the individual. His present views are in no respect modified.

It should be carefully noted that Lane practiced operation in those cases in which it was impossible to obtain accurate apposi-

tion of fragments. In 1893 the means of determining whether or not accurate apposition had been obtained were not so satisfactory as they are at present. Hence more depended at that time upon the knowledge obtained by inspection, palpation and measurement than it does at present. Lane stated in his original paper that the results obtained by splinting oblique fracture of the tibia and fibula in certain classes of laboring men, even though they were not characterized by marked shortening or deformity, were extremely bad; that the man's earning capacity was often not more than 20 to 30 per cent of his original capacity. This disability may be attributed to a deviation of the lower fragments of the tibia and fibula. If pressure be distributed in such an abnormal manner that the patients remain insecure in their joints, especially in those of the foot and ankle, they suffer from increasing pain. The advantages of operation are the immediate relief of pain coming from movement of the fragments one upon the other; the removal of extravasated blood between the tissues; the lessening of the period of incapacity from work, since union is by first intention; and a complete anatomic restoration of the bones to their original formation and axes.

Lane states that since the period of his paper he has operated upon an enormous number of patients, using wire, screws, or plates with uniform success. But few have required subsequent removal of foreign bodies. He notes that the cleanliness necessary for most operations must be far more absolute than in other surgical procedures. He alludes to the abuse to which he was subject and to the report of the committee of the British Medical Association appointed to investigate results. He states that this committee, after a thorough investigation, verified all his statements, publishing a separate report upon the subject, an unusual procedure. The wave of enthusiasm for this procedure was characterized by many disastrous results, and due, Lane states, to a complete ignorance of the simple laws of mechanics in part, but mainly to uncleanliness. He states that such surgeons "labored under the delusion that the very imperfect degree of cleanliness requisite for the safe performance of abdominal operations and the small amount of skill which is usually required for their success are sufficient for the surgical measures required in fitting together and securing in position the fragments of bone in a simple fracture."

There were many mechanical devices employed other than the straight steel plate; the texture or shape of the plate was altered or encircling bands of steel were used. Screws and plates of bone were employed. Lane feels that none of these modifications are as useful and effective as the straight steel plates. While it is true that the prompt operation on a simple fracture may be difficult, late operations on fractures united in bad position call for an even higher degree of surgical skill and mechanical knowledge than does the problem of the immediate operation. Indeed the difficulty may be well-nigh insuperable in so far as complete restoration of function is concerned. Lane alludes to an article he published in the *Lancet* of October 1, 1921, entitled "The Disastrous Results of Certain Abduction Fractures of the Ankle-joint," in which he quotes as follows:

"My experience of the treatment of this fracture, of which very many cases have passed through my hands since I first recognized it early in my career, is that it is very often impossible to replace and retain the fragments in accurate apposition by means of manipulation and splinting alone. That this is certainly the experience of others is fair to assume from the conditions presented by these cases which have come under my observation some months after treatment. As far as I could gather from the history of these patients, they were regarded as ordinary examples of Pott's fracture, and were all subjected to the process of so-called 'setting' which entailed the administration of an anesthetic. The limb was then put up in a splint and a perfect result was promised. Some were radiographed subsequently, but no mention was made to the patient of any residual displacement, if it was observed, and certainly no effort was made to rectify it.

"It is unfortunate that once the fragments of the tibia and fibula have united in their displaced position the possibility of separating the tibial fragment and of restoring it to its normal position is very small. This is due to the fact that the end of the tibia has formed for itself a new joint with the upper surface of the neck of the astragalus and the adjacent portion of the tibial facet on the astragalus, while the fibular and tibial fragments, having united with the shafts, articulate with the rest of the facet on the astragalus—which has become much altered in form—with the process of bone behind it.

"In the other varieties of adduction and abduction fractures it is usually possible by manipulation to replace the inner malleolar and fibular fragments in their normal position and to restore the function of the joint. In this particular fracture the presence of the displaced tibial fragment frequently forms what is practically an insuperable obstacle.

"Surgeons have no valid excuse for the very disastrous results that follow these methods of treatment, since it is possible to obtain excellent radiograms in most places in the country. What has puzzled me is that none of these unfortunate patients had resorted to the law courts, although the failure of the surgeon to perform his duty is only too obvious to the meanest intelligence, in view of the facility with which radiograms can be obtained by patients in the present day."

To one who has suffered the wave of reaction incident to delayed healing and untoward results the careful reading of Lane's paper and the report of the commission appointed by the British Medical Association is having the effect of leading him to consider again this whole question from the standpoint of ultimate function and to adopt as a fixed policy, not the routine opening and plating or application of wire nails to the fragment, or the routine splinting and traction of all these injuries, but rather the subjecting of each individual case to careful *x*-ray studies and a prompt surgical intervention when the functional result cannot be reasonably assured by conservative methods. In surgery as in other things there is action and reaction, and finally a swinging toward the rational movements.

## ABDOMINAL SYMPTOMS AND SIGNS OF THORACIC DISEASE.

If the records of any large hospital were accurately kept, and, if these records were examined by an earnest searcher for truth, there would be found records of abdominal operations performed because of symptoms entirely independent of any intra-abdominal condition. Attention has so frequently been called to the postperitoneal structures, particularly the kidney and the spinal cord, that abdominal sections for renal calculi, or early ataxia, are certainly less frequent than they were, and it is to be hoped are even exceptional. Although numerous papers have been written alluding to the reference of pain from the thoracic to the abdominal region, it would seem that both surgeons and physicians are too often ignorant of this fact, and, as a complication to a beginning pneumonia, an appendix is removed, a procedure which in no way adds either to the patient's comfort or his chance for an ultimate recovery.

Brooks writing on this topic states that his paper is virtually but an enumeration of the most frequent forms of thoracic lesions which are commonly confused because of their signs and symptoms with disease of the abdomen.

Among the most frequent lesions are coronary thrombosis or embolism, acute myocarditis, myocardial degeneration, especially from a fatty degeneration, or fatty infiltration of the heart, acute syphilitic myocarditis, gumma of the heart wall, pericarditis, acute or chronic. Among the cases in which acute indigestion is given as the cause of death he also notes that on autopsy some of them were found to be instances of acute or chronic aortitis, rupture of the aorta, or of aortic aneurism or of acute mediastinitis.

"Close analysis of the history of these cases will show abundant premonitory warnings. The story of acute abdominal pain, with sudden onset, with prostration, nausea and vomiting, is one of the terminal stages. At times, though not frequently, a cardiac lesion which has been of long duration and has given few or no indications of classical disease may terminate in this way, thus simulating acute gastric perforation or dilatation. Moreover, in these cases there is often a long-standing history of gastric distress as from chronic ulcer."

The author states that in several cases of angina pectoris the chief symptoms have been ascribed to gastric, duodenal, or gall-bladder disease. There are no symptoms and few signs of these diseases which may not be very closely simulated by cardiac disease. Even hemorrhage from the stomach may be due to pressure varices in the stomach or esophagus. An error in diagnosis leading to unnecessary surgery may readily be made when these cases are seen as emergency ones without an opportunity for careful study of the history and prolonged observation of the patient. It must also be borne in mind that there may be systemic lesions, secondary to the cardiac conditions, which clinically dominate the underlying cause of development.

Gross states that dyspnea, when it is to a degree out of proportion to the exciting exercises during which it appears, should always be assumed to indicate cardiac disease or inadequacy. If this be held well in mind it will frequently reveal such disease in cases of inadequacy, in which the preponderance of signs indicate abdominal disease. There are very few cases of mediastinal disease, giving striking abdominal symptons, which do not show more or less dyspnea often quite out of proportion to the apparent history of thoracic symptoms otherwise indicated in the case. Attention is also called to the frequency with which the symptoms and signs of even an early angina pectoris are referred almost exclusively to the abdomen. "This is particularly true of those patients in whom the anginal paroxysm commonly arises after eating, and in whom the hyperacidity, gastric flatulence, and especially the sharp pain located in the epigastrium, are the most constant manifestations of the angina. In some patients both coronary and pancreatic arterial spasm are present. The recognition of grave cardiac involvement is usually dependent upon the poor heart muscle tone, but pleural disease, and particularly the acute inflammatory lesions of the pleura, cause with great regularity the appearance of abdominal signs and symptoms. This is a fact which has been recognized for a very long time, and yet few, indeed, are the surgeons or internists who have not frequently confused acute pleural disease with serious inflammatory disease of the abdomen, notably with acute gall-bladder inflammation and with appendicitis. Theoretically the differentiation is, or should be, easy, but as a matter of clinical fact it is most difficult and in very many instances quite impossible without calling into the conclusion the very important factor of time.

"Obviously the confusion is most difficult to eliminate when the pleurisy is of the diaphragmatic membrane. In this location the definite signs of pleurisy may remain in abeyance for some days except for the abdominal manifestations. Temperature may or may not be present in either condition; leucocytosis may alike be present or absent. In either instance the respiratory movements are limited, usually more so on the chiefly affected side, though not at all infrequently one finds that the rigidity and tenderness of the abdomen is of the side opposite to that in which the pleural lesion is located. Of course, in the usual case the rigidity of the abdomen is more marked in the upper quadrants. All of us have seen instances in which the rigidity is as sharply located at McBurney's point, for example, as ever seen in true acute appendicitis. Not only do we find localized points of rigidity, often with a definite sense of intra-abdominal mass, but tenderness may also be present, and the sign of peritoneal irritation manifested by a sharp thrust of pain on the quick removal of the palpating hand.

"One point which has been of considerable assistance, though it, like all others, is often absent, confusing, or even misleading, is

the fact that in the pleural lesion respiration is more frequently accelerated than in the true abdominal lesion. This point is best determined when the patient is asleep, though it may be made out some time in the waking hours."

Although these abdominal symptoms are much more likely to be seen in acute and in inflammatory lesions of the pleura, they may also appear in the more chronic ones. Symptoms leading to a possible diagnosis of ulcer of the duodenum may also be closely simulated by pleural disease, and in some cases chronic hyperacidity of the stomach has its true explanation in an old pleural lesion.

"Of course the *x*-ray, and particularly the study of the respiratory movements and shadows under the fluoroscope, are of tremendous assistance in the differentiation of these cases, so also may be the diagnostic tap in those cases in which effusion is present. Frequently, however, particularly in the early phases of the process, in just the period in which conclusive diagnosis is most desirable from the surgical standpoint, the area of pleural disease may be small, and it may be further located at the very dome of the diaphragm, in which place detection is most difficult even under the best of circumstances.

"Another point of importance to recollect is that, while one may be able in certain of these cases to demonstrate old adhesions, effusion, or even definite acute inflammatory lesions of the diaphragmatic pleura, this finding by no means definitely excludes the coexistence of abdominal lesions of perhaps insistent surgical importance.

"Not only do lesions of the pleura give abdominal signs and symptoms of very striking and confusing character, but, what is even more difficult to explain on a physiological basis, the occurrence at times of striking abdominal signs and symptoms in disease of the lung without any pleural lesions which are detectable on autopsy. Of course, in most cases of pneumonia a pleurisy is also present, and it is very simple to assume, especially where the pneumonia occurs in the bases and then becomes overlaid with a pleurisy, that the symptoms of abdominal location are due to the pleural irritation.

"In instances such as this we find early fluoroscopy or *x*-ray plating of the chest of great assistance, and in several instances in which surgical investigation of the abdomen seemed indicated, the discovery in the author's service of deep central pneumonic foci has saved him from the serious error of a laparotomy. In yet other instances, however, as every expert radiographer and internist knows, definite signs and symptoms of a pneumonia, perhaps one manifested by abdominal symptoms very largely, may be present and yet the most searching fluoroscopic and *x*-ray examination show nothing. In such a chest Brooks has been able to demonstrate but a few hours thereafter extensive areas of consolidation.

"The mortality rate in cases of pneumonia which have had an unnecessary laparotomy imposed upon them is very high. The condition is, of course, not necessarily fatal, but add to the shock of the operation and the irritation of the anesthetic, the toxemia, and serious mechanical lesions of a pneumonia, and the chances of recovery are greatly diminished."

The wisest procedure is to wait until differentiation is possible. The author states that his extensive autopsy experience in the past has convinced him that the many cases of postoperative pneumonia in abdominal cases were really due to failure of diagnosis of a developing pneumonia, due to the predominance of its abdominal signs and symptoms. In most of these cases a reasonable delay would have given the correct diagnosis. He further states that several cases of pulmonary infarction have come to his service with a history of sudden stabbing pain in the right or left upper quadrant of the abdomen, commonly associated with a definite rigidity, often with an area of tenderness. He calls attention to the frequency with which obstructions of the esophagus, malignant or otherwise, are manifested by indications of gastric disease. This particularly refers also to the diagnosis of gastric ulcer or carcinoma, or of reflex

vomiting. Extensive ulcerative lesions of the esophagus, especially of the lower one-third, refer pain nearly to the epigastrium rather than to the point of actual ulceration. One of the most frequent methods of onset in chronic ulcerative pulmonary tuberculosis is with gastrointestinal signs and symptoms. Indeed, Osler speaks of it as one of the characteristic clinical pictures of onset in this disease.

"The importance of recognizing the fact that a complete picture of gastrointestinal symptoms may indicate pulmonary tuberculosis must be constantly borne in mind, for every gastrointestinal clinic is constantly seeing these cases. Many of them enter the hospitals under this diagnosis, and by no means infrequently surgeons see these cases under the tentative diagnosis of a gastric ulcer, and perhaps the differentiation is evident only on a full physical examination or when the roentgenologist in his examination of the abdomen checks up by a plate of the chest.

"In very many of these cases the indications of pulmonary disease are few in number; indeed, cough is either absent or infrequent; the asthenia, anemia, loss of strength and weight are accountable on the basis of the supposed gastrointestinal disease, so that correct diagnosis is likely to be made only from a complete physical examination, or, in carefully studied cases, from the negative physical findings in the abdomen, which then, of course, leads to a proper examination of the chest. The frequency of this condition emphasizes the importance in abdominal disease of either a complete physical examination in all cases or the finding of definite and certain physical lesions in the abdominal organs before resorting to operative measures. This is no field for exploratory laparotomy. Consulting internists are not infrequently called in to see cases diagnosed as gastric ulcer with hemorrhage, sometimes to consider the advisability of operation, when complete investigation shows the hemorrhage to have originated from an advanced lung tuberculosis."

# Progress in Therapeutics

## Medical Therapeutics

**Shaking Arsphenamine Solutions in Air.**

SCHAMBERG, KOLMER, and RAIZISS, in the *American Journal of Syphilis* for January, 1922, conclude:

1. The undue shaking of alkalinized solutions of arsphenamine increases the toxicity; the shaking of such solutions is rarely necessary.

2. The shaking of acid solutions of arsphenamine for one minute beyond the time necessary to effect solution is accompanied by a slight increase in toxicity. Ten minutes' extra shaking increases the toxicity still further.

3. The shaking of solutions of neoarsphenamine for even such short periods as one minute is accompanied by a great increase in toxicity. Shaking for ten minutes enormously increases the toxicity.

4. It would appear from the studies of Roth and from those which they have conducted that neoarsphenamine should be dissolved with as little agitation and as little exposure to air as possible.

5. Different lots and brands of arsphenamine and neoarsphenamine vary considerably in their liability to oxidation on shaking.

6. The trypanocidal power of acid solutions of arsphenamine is considerably increased after one minute of shaking, but is decreased after ten minutes' shaking.

7. The trypanocidal power of alkaline solutions of arsphenamine is considerably

increased at the end of one minute's shaking, and the increase is still evident after ten minutes' shaking.

8. The explanation of the increase in trypanocidal power is probably to be found in the formation of "arsenoxide," which is known to exert a greater trypanocidal and spirocheticidal effect than arsphenamine.

9. The shaking of solutions of neoarsphenamine is not accompanied by increase in trypanocidal effect.

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### The Action of Diphtheria Toxin upon the Circulation.

YABE, in the *Journal of Pharmacology and Experimental Therapeutics* for February, 1922, states that the effects of diphtheria toxin on the circulation and respiration only appear many hours after its injection even when a dose that is many times that ultimately fatal is injected intravenously in animals. All attempts to analyze its action in acute experiments are therefore futile, and further light can be thrown on its effects only by examining the condition of animals subjected to it many hours previously and comparing their symptoms with those of controls. In a series of such experiments, the blood-pressure was found to be lower than in the controls, and this appeared to be due to failure of the central vasomotor mechanism. No evidence of direct action on the peripheral vasoconstrictor nerves, or on the vessels of the heart, was obtained.

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### The Relation of the Peripheral Circulation to Diseases of the Heart.

BARR, in the *New York Medical Journal* of February 15, 1922, states that when one is dealing with a case of degenerative changes in the heart and aorta, one should make judicious use of a little common sense. If the systolic and diastolic pressures be both high with a gentle gradient, one can depend upon it the cardiac muscle is still fairly healthy and the aorta fairly elastic. One should, therefore, lessen his work by devoting attention to the periphery. Vasomotor relaxants, such as the nitrites, are here of not much value except as temporary expedients. If the patient has gouty kidneys, the purin bodies and other nitrogenous elements of food should be cut down, and the free administration of the benzoates proves useful; the bowels should be well cleared out with a good cholagogue cathartic or a brisk saline; if there be great cardiac distress with urgent dyspnea, a dose of morphine or morphine and atropine is the most effective remedy. If there be too much lime in the system, as is highly probable, all milk foods and jellies should be eliminated from the diet, and decalcifying agents, such as phosphoric and citric acids and their soluble salts, should be freely used and the amount of sodium chloride cut down. The action of the skin should be encouraged, and the patient should take plenty of outdoor exercise in a warm, dry atmosphere. Graduated exercise in the form of skipping is highly beneficial. If corpulent, the caloric value of the food should be kept low and the amount of nitrogen regulated by the capacity of the kidneys.

With high systolic and moderate or low diastolic pressures the elasticity of the aorta is becoming impaired. When the difference exceeds 40 mm. of mercury it is high time to think of effecting repairs. In many of these cases, even when the aorta is much dilated, the second sound clear and ringing, and the heart's action irregular or intermittent, it is really marvelous to see what improvements can be brought about by careful management. The patient should be kept on a light, dry, non-stimulating diet, little or no salt, and he is much better without alcohol in any form. Decalcifying agents in such cases are as a rule useful unless there be a sacculated aneurism, and then it may be necessary to give lime salts. When an aneurism occurs the systolic and diastolic pressures will fall, and then the cardiac hypertrophy may disappear. Rest, dry diet, lime salts, and moderate catharsis may effect a cure.

For many years he has made regular use of the Abrams cardiac reflexes in the treatment of heart disease and considers them invaluable. They are not intended to resuscitate the dead, but for revivifying the living they are inestimable. These reflexes are readily elicited by the following method: Take a medium-sized cork, place an end on the seventh cervical spine, and on the other end of the cork give thirty short, sharp taps with a plexor or a small hammer. Repeat this on the second dorsal spine. Wait a minute, and then repeat this series on the seventh cervical and second dorsal. Again wait a minute and repeat a third series. This procedure, if properly carried out, will reduce the transverse diameter of a large dilated heart by at least two inches, and the heart will remain contracted for one or two hours. At the same time the aorta is materially contracted, and pulsation in the suprasternal notch disappears; hence this maneuver is of great value in the treatment of aneurism. Personally he has had many successes. Those who have difficulty in mapping out the deep cardiac area can easily feel a large thumping apex heart in the axillary line, and after percussion feel it in the nipple line.

In the case of a big heart which does not readily respond to this reflex the prognosis is bad. This reflex should be elicited several times daily, and it is much more effective than a similar number of doses of digitalis. As an aid in delineating the deep boundaries of the heart, if one taps the seventh cervical spine or the acromial end of the left clavicle with the middle finger of the right hand, and at the same time carries the fore or middle finger of the left hand along the third, fourth or fifth left intercostal space, as soon as that finger reaches the border of the heart one will feel an impact of the heart against the finger, and the percussion note will become dull.

The Abrams cardiac reflex of dilatation is elicited by percussion between the third and fourth dorsal spines, which stimulates the depressor nerve. This should be followed by percussion over the second dorsal, which he has termed a fixation complement as it prolongs the reflex. This reflex is exceedingly useful in true angina where there is spasm of the heart, a slow, small, firm pulse, and cardiac distress. In many of these cases there is also pylorospasm with distention of the stomach; this is relieved by giving a glass of hot water, and then percussing the fifth dorsal spine.

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**Luminal in Epilepsy and as a Sedative.**

VOJE, in the *Chicago Medical Recorder* for February, 1922, states that luminal reduces undue excitability of the cortex and subcortical strata of the brain without unpleasant constitutional or mental effects—it is therefore a superior remedy to the bromides in epilepsy.

Luminal is helpful in overcoming any kind of mental or nervous excitement.

In luminal slumber, nerve cells rest and recuperate, poisons are eliminated. Any kind of delirium or maniacal attacks are therefore overcome much quicker while the patient is in this slumber, with few exceptions.

Luminal seems superior to other remedies in the overcoming of drug, tobacco, and alcohol habit.

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**Clinical Notes on Hearts in Hyperthyroidism.**

HAMILTON, in the *Boston Medical and Surgical Journal* of February 16, 1922, concludes that from a personal examination of a large number of hearts in hyperthyroidism it appears that the great majority of hearts in these cases are found with no evidence of damage. Heart failure is not found in this class of cases, even when death occurs.

Hyperthyroidism in the presence of (*a*) rheumatic heart disease, (*b*) middle age (over forty-five years), has a tendency to cause established or paroxysmal auricular fibrillation.

Many cases of hyperthyroidism showing

auricular fibrillation are relieved of their auricular fibrillation after relief of hyperthyroidism by operative measures, while digitalized.

Cases with auricular fibrillation without true signs of heart failure have stood operation well.

All auricular fibrillation cases with hyperthyroidism can be improved by digitalization. It is suggested that digitalization has a favorable influence on the cure of auricular fibrillation in hyperthyroidism.

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### Angina Pectoris.

ALLBUTT, in the *New York Medical Journal* of February 15, 1922, states in the treatment of angina there is not much that is new. He proposed in his first paper rest as a main part of the treatment, for the same reasons as in aneurism of the aorta. In severe cases this means likewise many weeks in bed. It is not always possible for the patient to surrender himself to such a discipline, but where he has been able to give the method fair trial it has answered expectations. In one case of exceptional severity the patient made arrangements for a long confinement, and was in bed for five months. Gradually the attacks, intense and almost incessant at first, grew milder and less frequent, and the patient is now at large, making even short journeys from home without ill effects. Colleagues of his tell him that they also have found good effects from this method. The seclusion from calls of business or society, the suppression of the door-bell, and the equal temperature give rest to the parts affected, and to the upper nervous controls. The diet is of course adjusted to the state of rest and of the stomach.

Although the nitrites often relieve the false anginas, and do not always relieve the true, still they are an invaluable aid. They must be fresh; they soon fade. As Osler and others have said, the doses may be increased far above those in general use. It is true that patients become somewhat inured to them, but they are harmless and we do not hear of any morbid craving for the drug. As to the prescription of atropine, as a prophylactic agent against fatal inhibition, the recommendation he makes is that the dose may need considerable increase—to one-fiftieth or even one-thirtieth of a grain. Digitalis may be useful; it is hard to say when and how. Perhaps acceleration of the pulse may be a guide. In angina it is a double-edged weapon, and often does harm; unfortunately we have no criterion for use or refusal. It is not true, however, to say that digitalis would raise arterial pressure by peripheral constriction, for in medicinal doses it has not this effect. Theobromine sodium salicylate, harmless at worst, comes in usefully when we have reason to think that the circulation, as indicated by scanty urine and the like, requires some reënforcement. On arsenic and iodide of potassium he has nothing more to say than is generally known; both these drugs are of some service. On diet in the treatment of angina he speaks more than once in the course of this article, but its importance as to cure or relief cannot be too strongly reiterated.

In conclusion he alludes to Jonnesco's operation for the relief of angina, and so for the saving of life, by the division of the left sympathetic in the neck. He reports two cases of success. Time and larger experience are necessary before any opinion on this method can be pronounced, but Allbutt points out that Jonnesco assumes the origin of the pain to be in the chronically inflamed investment of the aorta, and proceeds therefore to cut the path of transmission to the cord and encephalon.

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### Limitations of the Reincision of the Tympanic Membrane.

KOPETZKY and SCHWARTZ, in the *Archives of Pediatrics* for February, 1922, say of what avail is it to repeatedly incise a drumhead to evacuate pus and to attempt to prevent an operation on the mastoid process in the type of case whose clinical history, bacterial flora and general aspect are such that we are reasonably certain that it falls within the group-type termed "hemorrhagic mastoiditis?" In this type the bony frame-

work of the mastoid is not broken down; and macroscopically it is not affected. The blood-vessels are greatly dilated, the mucosa red and swollen, and a little serum and thin pus may be found scattered through the mastoid cells. The infection is not walled off, as in the coalescent type, but the dilated blood-vessels rapidly carry the infecting organisms throughout the mastoid and, unless the process is promptly and completely checked, even further, into the sinus, meninges, and brain. This form has been rightly called the dangerous form of mastoiditis; and its prompt recognition is imperative for the preservation of the patient's life.

Yet, strange as it may seem, it is this form which is most frequently overlooked by the attending physician. The patient complains of pain in the ear, and there is a high temperature, 103° or 104°. Paracentesis is promptly and properly performed, a free incision being made in the membrana tympani. Much to the surprise of the attendants on the case, there is only a slight seropurulent discharge from the middle ear, the temperature has again gone upward, and the patient is distinctly ill. There may be slight mastoid tenderness, but not sufficient to occasion alarm. Consequently, because the discharge has been so slight and the systemic symptoms so marked, another paracentesis is performed; then, perhaps a day later, another. And in the meantime the mastoid infection has continued unchecked, and complications with symptoms referable to the sinus and meninges put in an appearance. This picture is not overdrawn, for it has been observed time and time again during the past two years, especially during the recent influenza epidemics. In these cases valuable time has been lost, repeated paracentesis has not prevented the operative mastoiditis, and the patient's life has been greatly endangered. A slight discharge from an incision in the membrana tympani may mean, not an insufficient opening, but a virulent infection. In this type of mastoiditis there should be borne in mind another factor—the simultaneous involvement of both middle ear and mastoid where both demand surgical interference almost from the onset.

Again, in the so-called coalescent type of case, where drainage is profuse and inspection reveals that the incision of the drumhead is adequate, and the pus comes away in pulsations, too profuse in quantity to be considered as coming from the tympanic cavity, what is accomplished by reincising the drum in these cases? Here the postulate of Schiebe and Boenninghaus has been met, and other problems than drainage are demanding solution.

The fact that they desire to stress is that we must familiarize ourselves to a greater extent with the types of acute purulent otitis media and of mastoiditis. Let knowledge of these become more general, and agreement upon the surgical procedures to be employed will soon ensue.

Of paramount importance to the otologist and patient are the effects of repeated paracentesis on the course of the disease and the final result. When, after the delay occasioned by the attempts to cure the mastoid disease by reincisions, the patient finally comes to operation, the disease may be far advanced, with marked destruction of the mastoid structure. Due to the frequent incisions, the drum is shredded or may be practically destroyed; and although the mastoid wound closes properly and promptly after operation, a persistent otorrhea may continue for months or years from the middle ear. Then we are confronted with the problems which a chronic purulent otitis media presents, where such a contingency could and should have been avoided.

The hearing is markedly impaired in many cases treated by reincision, for either the opening in the drum cannot be closed, or a scar is formed which is so large and so adherent to the promontory as to render the drum useless as an aid to hearing. The damage done by the knife thrusts to the delicate middle-ear structures is often irreparable; and the symptoms of the so-called "progressive deafness" supervene to make life miserable for the patient—and all this where simple mastoidectomy, performed in

its proper time, would have prevented the complications. These are the conditions which the pediatrist and the general practitioner did not see, for later in life it is to the otologist that they come for relief.

It has been claimed that the drum membrane is not essential to hearing and that patients with the entire drum gone may hear perfectly well. This is more apparent than real, and functional tests prove the fallacy of the contention.

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### Egg Yolk in Infant Feeding.

DeSanctis, in the *Archives of Pediatrics* for February, 1922, states that during the last two years he has used egg yolk as an adjunct in difficult feeding cases. Its value was recognized in certain cases which did not do well on various formulas and in which as much food was given as was possible. In the first case in which it was tried, an infant three months old had been receiving a formula of whole milk, water, and dextri-maltose; 65 calories were given per pound per day with no gain in weight; the food was then increased gradually until 85 calories per pound per day were given. The infant was taking all the food, was not vomiting, was having normal stools, and still did not gain. After giving such a strong formula for a few days the child began to vomit, so that it was necessary to reduce the food to 65 calories per pound. One teaspoonful of the yolk of a soft-boiled egg was then added daily to the formula. The response was immediate, the child gained in weight, and the general condition improved. The yolk was then gradually increased until the whole yolk was added daily. From that time on the infant gained 8 to 12 ounces weekly.

That the gain in weight was due to the extra calories added in the form of the egg yolk can be ruled out because the child did not respond when 85 calories per pound per day were given. The writer believes that the gain in weight was due to the addition of the fat-soluble B vitamine contained in egg yolk. Since the first experiment, egg yolk has been used in many cases with the same result. It has also been observed that infants receiving the maximum amount of food (65 calories per lb.) and 1 to 2 ounces of orange juice, who were not doing well, would gain immediately when egg yolk was added to the formula.

The fact that orange juice was given before the addition of egg yolk would rule out that failure to gain in weight was due to a deficiency of the antiscorbutic vitamine. Undoubtedly the fat-soluble B vitamine plays an important part in the nutrition of infants. In giving the egg yolk to infants, the fat-soluble B vitamine is added in considerable amounts, and can be given with safety to infants as early as the second month, as it very rarely causes a gastrointestinal upset. In his experience it is very valuable in:

1. Athreptic infants.
2. Infants receiving the maximum amount of food (65 calories per pound per day) and ½ ounce of orange juice and still not gaining.

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### Alcohol in the Diabetic Diet.

Allen and Wishart, in the *Journal of Metabolic Research* for Februry, 1922, conclude that their experiments upon two patients with severe diabetes support the prevailing belief that ethyl alcohol is not converted into sugar in the body. At the same time they interpreted their results as signifying that the addition of calories in the form of alcohol in excess of the patient's caloric tolerance produces a return of glycosuria and other diabetic symptoms.

Their experiments also corroborate the prevailing view that alcohol is not converted into acetone in the body. No antiketogenic action was demonstrable; on the contrary a slight production of acetone seemed to be caused when alcohol was given in considerable quantities. Luxus diets formed by the addition of alcohol, or a mixture of fat and alcohol, to a standard diet gave rise to very much less acidosis both chemically and clinically than similarly excessive diets built up by the addition of

fat alone. The former therapeutic use of alcohol is thus justified, with respect to the lessened danger of acidosis when part of the fat of a high caloric diet is substituted by alcohol. The experiments do not establish such a fact for undernutrition diets, or warrant attempts to prevent combustion of body fat by administration of alcohol. On the contrary, the conversion of an undernutrition diet into a luxus diet by addition of alcohol may result in an actual increase of acetone. No experiments with coma were performed, and conclusive tests here would be difficult to devise, but the above facts agree with the prevailing clinical practice, which has abandoned the use of alcohol in the treatment of coma.

With additions of alcohol, just as with additions of fat, the high caloric rations which were hoped to increase the weight and strength of emaciated patients failed to do so. As usual, the patients were stronger and more comfortable on diets which controlled their diabetes than on higher allowances which produced a return of diabetic symptoms.

The experiments with alcohol, if fully confirmed, are of crucial importance in supporting the undernutrition treatment. They add to the existing evidence that the assimilative power of the diabetic organism is limited not only in respect to carbohydrate (preformed or potential), but also in respect to total calories as such; in other words, that the very nature of diabetes consists in inability to assimilate more than a certain total diet or carry more than a certain body weight, both of which are limited in proportion to the severity of the diabetes. In confirmation of the view that the harmfulness of excessive fat in diabetes does not consist merely in its possible conversion into either sugar or acetone, but preëminently in the overload of the total metabolism, it is found that alcohol, which is clearly recognized as not convertible into sugar or acetone in the body, produces a return of glycosuria and other symptoms when added to the diabetic diet in quantities exceeding the caloric tolerance. One incidental deduction from this fact is the difference between the specific metabolic defect which constitutes diabetes and any non-diabetic form of glycosuria superficially imitating it, such as phlorizin poisoning. The most important lesson, however, is that all attempts to find some special or synthetic food which the diabetic shall be able to metabolize, so as to restore normal nutrition without excretion of sugar or acetone, are forever impossible. The endeavor to strengthen or fatten the diabetic individual with any kind of food in excess of his caloric tolerance entails an inevitably fatal result. This limitation of total assimilation and body weight cannot be circumvented, and can only be removed by a cure which shall supply the missing product of the pancreas.

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### The Treatment of Gastric Ulcer.

HALE-WHITE, in the *British Medical Journal* of February 11, 1922, states that we must first search for the source of infection and, if possible, remove it; this may lead to the disappearance of the symptoms. If it does not, the outlook is still good, for the natural tendency of acute ulcer is to heal completely. Put the patient to bed; rest in itself is good, and the diet will not contain enough calories for much work. The food must not be such—for example, meat or meat extractives—as will lead to the secretion of much acid; it must not be mechanically or chemically irritating; it must be capable of passing quickly and easily through the stomach; it must not stimulate this organ to excessive contraction, and must be sufficiently nutritious. He is accustomed to employ milk and raw egg, beaten up in it, in the proportion of two eggs to each pint of milk, giving seven and a half fluidounces of this every two hours during the sixteen hours the patient is awake, and an extra feed if she happens to wake in the night. It is almost always unnecessary to peptonize the milk, but this may be done if the patient does not mind the taste. This gives 1600 calories a day. Unless she has a distaste for it, she should take some olive oil; she is much more likely

to be able to do this if the very best quality is given, namely, that which comes from the first expression—if necessary, it may be flavored with a little black coffee; the patient may have it as often as she cares for it in the day, provided it is not nauseating. Its advantages are that it is a food, bland and unirritating. It restrains the secretion of acid and is a mild aperient. One fluidounce contains 560 calories. The total daily caloric value of the diet is now about 1700 calories, which is enough for a patient lying in bed; she does not lose weight on it. Ulcers cannot be expected to heal if the body is under-nourished. Any dietary which leads to considerable loss of weight is wrong. In former days, when rectal feeding was common for gastric ulcer, many patients failed to get well because they were starved severely; it is impossible to prevent this on rectal feeding.

The chief drug should be an alkali to counteract the gastric acidity; sodium bicarbonate is frequently chosen with excellent results, but if it leads to distention lime water or magnesia may be substituted. Not less than 25 grains of bicarbonate three times a day should be given. Tincture of belladonna checks the secretion of acid and excess of gastric movement. A good mixture is sodium bicarbonate grains 25, tincture of belladonna minims 10, bismuth subcarbonate grains 15, tragacanth powder q. s., with chloroform water to make one fluidounce: this may be given thrice daily. If an aperient is required, magnesia is the best. This treatment can generally be easily borne for six weeks; it is very simple. He has used it for many years, and patients do well on it. Several authors change the diet as the case progresses. There is no need for this; we cannot see how the cure is proceeding, and we are more likely to cure and prevent relapses in proportion as we are thorough in treatment. Many diets published are complicated; the simpler they are, the more likely are directions to be obeyed.

Cases are much too often treated in a half-hearted manner. If the doctor decides that the patient ought to be treated as though she had a gastric ulcer, let her be so treated, and not just sent away with a bottle of medicine. We have no means of estimating, in the class we are now considering, how much the stomach was ulcerated when the patient was first seen, nor how the cure is progressing, therefore Hale-White suggests certainly not less than four weeks on the treatment—he always tries to get six. Perhaps some of the mildest cases are thus treated too long, but it is better to do this than to treat some for too short a time, so that they fail to get well or relapse. The time spent in bed must vary with the case: four weeks may be desirable, but often it is well, earlier than this, to get the patient up in a chair for part of the day, out-of-doors if possible, provided she is warm. A little massage to the limbs helps to keep the patient in good condition. When the period on this diet has come to an end the patient may by degrees return to normal food, but this should always be plain, without much meat, and she should always masticate thoroughly. Unless perforation takes place these patients do not require the aid of a surgeon.

Although, thanks to *x*-rays, chronic ulcer is much more easy of diagnosis, the treatment is more difficult and uncertain. We badly need a series of cases with *x*-ray pictures before and after medical treatment. Should it be decided to try the cure just described he employs the same as that just given, but it will have to be more prolonged; it must last for many weeks.

This class of ulcer is more common in hospital than in private practice. Hospital patients cannot afford to be away from work long. Surgery is easier in hospital than in private practice; a cure from surgery is quicker and probably more certain than that from medical treatment, and nowadays the risk to life from surgical treatment is slight; therefore surgical treatment, whilst often desirable anyhow, is especially so for hospital patients. Medical treatment should only be undertaken for those in whom the *x*-rays do not indicate an ulcer—for they certainly fail to reveal it sometimes—or show that it is small. Its

progress should be watched by *x*-ray examinations, say every six weeks; if it is not getting less the surgeon should be consulted, as he should if relapse has occurred after medical treatment, or this fails to benefit the symptoms.

In trying to decide when to adopt surgical treatment we must remember that even if the ulcer heals, pyloric stenosis, hour-glass stomach, or perigastric adhesions may follow, and all require surgery. Perforation, subphrenic abscess, fatal hemorrhage, or transition from a simple to a carcinomatous ulcer may occur at any time before complete healing, and when this has taken place dyspepsia may remain.

Gastroenterostomy is by no means a universal panacea; it often fails to do any good. On the other hand, in suitable cases —for example, pyloric obstruction—the benefit is so great that if the patient is one for whom this operation is indicated it had better be done at once without waiting for medical treatment.

Perforation requires instant surgery. Every hour's delay greatly increases the risk of death. However severe the hemorrhage in the case of acute ulcer, no attempt should be made to stop it by surgery. Experience has shown that this increases very considerably the risk of death, for patients blanched by bleeding bear operations badly; and further, as the bleeding is often from many points, the surgeon cannot stop it; it can almost always be controlled by nature, aided by medical help. If in the second class hemorrhage is severe, operation should not be undertaken until the patient has recovered from its effects; then the question should be discussed whether it would be wiser for the surgeon to interfere with a view of preventing a second bleeding; certainly after the second he should operate to prevent a third. Even the rare event of death during a profuse hemorrhage should not make the physician blame himself for failing to ask surgical aid, but had the patient been operated upon during the bleeding the chances of recovery would have been lessened.

The medical treatment for bleeding from a gastric ulcer of any sort is absolute rest in bed in a quiet room without visitors and enough morphine subcutaneously to keep the sufferer gently under its influence. If the symptoms show that the bleeding has been excessive, 2 grains of calcium chloride dissolved in water should be injected intramuscularly night and morning; this dose definitely increases the coagulability of the blood. No food or drink should be given by the mouth or otherwise for twenty-four hours. At the end of this time, dextrose in solution in tap water, 525 grains to the pint, may be given by the rectum, half a pint two or three times a day. But it is unlikely that all this can be retained and absorbed, so that the patient hardly gets more than 800 calories a day this way. Although this is by far the best rectal feed, it is a starvation diet on which it is improbable that ulcers will heal; therefore, in two or three days at latest some milk in hourly or half-hourly feeds should be given by the mouth, and, as rapidly as possible, the patient should be got upon the diet already mentioned as suitable for ulcer of the stomach. Hale-White strongly suspects that, in the past, very many cases have been lost from too prolonged rectal feeding and consequent starvation; it must be remembered that these patients are often already under-nourished from severe dyspepsia at the time the bleeding occurs. Transfusion may be of great help, but in the nature of things it is unfortunately often impossible to carry it out at short notice.

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### Encephalitis Lethargica.

SNIDER, in the *Journal of the Missouri State Medical Association* for February, 1922, states that in typical, well-developed cases the diagnosis is not likely to prove difficult. History of headache, vomiting, dizziness, and double vision are sufficient to arouse suspicion that the disease may be encephalitis lethargica. Finding stupor or torpor with cranial nerve palsies gives confirmation of this suspicion, and a clear spinal fluid showing increase in lymphocytes and negative Wassermann test makes

the evidence fairly complete. With such a case only one other diagnosis is tenable—that of tuberculous meningitis. In differentiating the two conditions the following points are to be considered:

| | *Tuberculous Meningitis.* | *Encephalitis Lethargica.* |
|---|---|---|
| Onset..... | Usually gradual. | May be gradual, but often is sudden. |
| Temperature.... | Low at first—rising toward end. | Higher at onset and of brief duration. |
| Course..... | Fatal within three or four weeks. | May last for months, and is not necessarily fatal. |
| Cranial nerve palsies..... | Appear late and are persistent. | Often occur early and are irregular and may be fleeting. |
| Spinal fluid: | | |
| (a) Cell count.. | Low at first with progressive rise. | Highest at first and gradually falling. |
| (b) Globulin... | High globulin content. | Little globulin present. |
| (c) Film..... | Typical film on standing. | Usually no film |
| (d) Tubercle bacilli.... | May be found on repeated examination. | Not found. |

Despite the most careful examination and study differentiation between the two conditions may not be possible until a relatively extended period of observation.

Acute anterior poliomyelitis often produces a picture very much like that of some cases of encephalitis lethargica. The following differences between the two conditions may aid in the diagnosis:

| | *Acute Anterior Poliomyelitis.* | *Encephalitis Lethargica.* |
|---|---|---|
| Occurrence..... | Chiefly in summer and fall. | Chiefly in winter and spring. |
| Individuals attacked..... | Usually children. | More than half of victims are over ten years old. |
| Palsies: | | |
| (a) Distribution..... | Extremities commonly involved. | Usually involves cranial nerves. Involvement of extremities uncommon. |
| (b) Time of appearance.. | Occurs early. | Usually appears late. |
| (c) Duration of palsies.... | Residual permanent palsy frequent. | Residual permanent palsy infrequent. |

The differentiation between encephalitis lethargica and acute non-suppurative encephalitis may be rather difficult. It is to be remembered that acute non-suppurative encephalitis occurs as a complication of acute infectious disease, that its course is usually characterized by frequent convulsions, that it is of short duration, and that it is not characterized by profound lethargy. The differentiation may in final analysis rest on the history of an acute infectious disease immediately preceding the onset of cerebral symptoms.

While it is true that the majority of patients who have encephalitis lethargica recover, we must not forget that the course of this disease is very variable and cannot in any given case be predicted with accuracy. After the patient is apparently convalescent he may suffer a return of previous symptoms, or despite improvement of general condition he may become the victim of psychic disorders, a feeling of unreality, changes in disposition, irritability, or inability to concentrate his mind on any given subject. Neuromuscular symptoms, such as tremor, choreiform or athetoid movements, hiccough, or myoclonia may recur and persist for a long time.

Since no specific etiologic agent and no specific cure has been found for this disease, treatment must be largely general and symptomatic. As in other acute infections rest is of prime importance from the outset. The patient should be kept as quiet as possible, both physically and mentally. Excretion should be encouraged by large fluid intake and the nourishment kept high, for in severe cases death may result from inanition because of difficulty in feeding. The rest should be prolonged even after the convalescence is well established in order that danger of relapse or distressing sequelæ may be minimized. Sedatives and hypnotics should be used when necessary to control restlessness and delirium or mania.

Often marked relief from the general cerebral symptoms, such as delirium or stupor, may be obtained by removal of spinal fluid by lumbar puncture. If this gives relief it should be repeated as indicated by symptoms.

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## The Principles of Aseptic Treatment of Large Amebic Abscesses.

In the *Lancet* of March 25, 1922, ROGERS states that not many years ago, before our present views of the etiology of tropical liver abscess were established, they were naturally looked on as ordinary septic collections of pus, which it was an axiom of

surgery should be laid open and drained as early as possible, like those in other parts of the body. There was, however, one exception to this rule, and that a very important one from his present point of view. It was long ago recognized that opening the large cold tubercular abscesses connected with bone disease, such as caries of the spine, was only too often followed sooner or later by secondary septic infections of a most exhausting and frequently fatal nature, and as a result of this knowledge tubercular abscesses have for long been increasingly treated by aspiration through sound tissues, with or without the injection of antiseptic substances, but without allowing any air to enter the cavities.

As soon as he was able to establish by the examination of a much larger series of cases than his predecessors that amebæ were constantly present in the walls of tropical liver abscesses and that the great majority of them were primarily sterile as regards bacteria, Rogers realized that collections of pus produced by a protozoal organism did not necessarily require the same treatment as those due to pyogenic bacteria, and he began to look for some chemical inimical to the ameba which might safely be injected into such abscesses after removing as much of the pus as possible by aspiration. At that time irrigation of the large bowel by quinine solutions had been recommended in the treatment of amebic dysentery, so he began testing the action of certain drugs on active amebæ contained in the walls of liver abscesses obtained as fresh as possible from the post-mortem room, and as early as 1902 he reported the following effects of solutions of quinine in normal salt solution: A 1:1000 solution had no effect in several hours, although much weaker solutions had been advised as a bowel wash, a 1:500 solution stopped the movements of the organisms in five to fifteen minutes as a rule, but a strength of 1:100 was required to render them inactive and granular in appearance within five minutes, apparently destroying them.

Many years later Dale and Dobell pointed out that such tests may be fallacious owing to the frequent rapid death and degeneration of *Amœba histolytica* outside the human body, but clinically he and others whom he got to try it found that washing out the cavities of recently opened liver abscesses with even a sterile 1:500 solution of quinine did as a matter of fact cause a rapid decrease in the number of active amebæ in the pus, and in two or three days changed a thick pus containing amebæ into an almost serous fluid with great benefit to the patient and more rapid healing of the pocket. These experiments also became the starting-point of many years' trials of his method of repeated aspiration and injection of ameba-destroying drugs into the cavities of liver abscesses without drainage, which were eventually crowned with success.

In view of the successful treatment of abscesses of the liver and spleen by the method already described, he suggests a trial of the following procedure in cerebral cases. The fatal effects of amebic cerebral abscess must be mainly due to their pressure symptoms, while the rapid course leaves no time for emetine to produce encystment unless the intracranial pressure is relieved by an early decompression operation, at which advantage should be taken of any possible localizing symptoms to attempt to draw off the pus with a syringe. Emetine should then be injected subcutaneously morning and evening in 1-grain doses, or as much as the patient will stand, in the hope of bringing about destruction of the causative amebæ and encystment of the abscess, the aspiration of the pus being repeated as often as necessary if the collection has been localized, although at the best some permanent damage to the brain is likely to remain. Such a plan of treatment seems to Rogers to be at least worthy of consideration in view of the hitherto hopeless outlook.

Rogers's conclusions are that the great majority of large amebic liver abscesses, which are sterile as regards bacteria, can easily be cured by repeated aspirations, combined with the all-important administration of the specific ameba-destroying ipecacuanha and emetine, with a resulting

reduction in the mortality to one-fourth of that of the generally used open operation; while in the few exceptional cases requiring incision sterile siphon drainage should always be used to avoid the formerly common and fatal secondary bacterial infections following open drainage in tropical countries.

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### The Newer Method in the Treatment of Burns.

MICKLETHWAITE, in the *Ohio State Medical Journal* for March, 1922, states that some paraffin dressing properly applied, after the burned area is comparatively free from infection, seems to be the best dressing for burns, because it is—

1. Painless, if the burned area is thoroughly dry.
2. Protective, for it keeps infection out.
3. Splinting, for it serves as a splint for the new epithelium.
4. Readily applied. The length of time necessary to apply being at a maximum about 30 minutes.
5. Relatively low in cost, a burn 12 inches square costing about $1.00 a week for dressing.
6. Allows removal of dressing in one piece, absolutely without pain and without any further tissue destruction.

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### A New Bactericidal Agent for Use in the Conjunctival Sac.

GRADLE, in the *Illinois Medical Journal* for March, 1922, states that not quite a year ago a new bactericidal agent called neo-silvol was placed in his hands for experimental use. It is a colloidal compound of silver iodide with a soluble gelatin base, the latter preventing coagulation and precipitation of the finely divided silver iodide which is in suspension and not in solution. It is soluble (if colloidal suspension may be called solution) up to 30 per cent, forming a milky-white, slightly viscid liquid. This does not turn dark on exposure to air and light and does not stain the skin or linen. However, there is the disadvantage that the solution undergoes a change within a week and must be freshly prepared at least every seven days. In 10-per-cent solution it is not irritating to the conjunctiva. The laboratory reports show that the carbolic acid coefficient is about "5" by the Rideal-Walker method when tested on *bacillus typhosus*, indicating that the germicidal power of neo-silvol is five times that of an equal solution of carbolic acid from a purely experimental standpoint.

Clinically, neo-silvol in 10-per-cent solution has proven very useful in certain definite types of cases. It was used in 37 cases of acute purulent conjunctivitis with mixed bacterial flora with very satisfactory results. Seven cases of blepharoconjunctivitis yielded with a fair degree of rapidity to the compound. In three cases of hordeolum no appreciable results were found, and the use of the drug did not prevent a recurrence of the condition. Three corneal ulcers of low degree were treated with neo-silvol, but it could not be seen that the results were superior or more rapidly attained than by other methods. It was used in two cases of purulent dacryocystitis, but without noticeable effect.

From these few cases, which it is entirely unnecessary to detail, it would seem that neo-silvol is particularly useful in acute purulent inflammations of the conjunctiva of mixed bacterial origin. The penetrating power of the drug does not seem to be greater than that of other colloidal silver salts, and consequently but few results were obtained where deep penetration into the tissues was necessary. The desired effects seem to be heightened if the drug is used in the following manner: Instil one or two drops of 10-per-cent neo-silvol into the conjunctival sac and allow to remain for a minute or two; then flush from the conjunctival sac the mucofibrinous secretion which has been loosened by the neo-silvol (allow the patient to use an eye-cup with boric acid or salt solution or any mechanical flush); dry the eye by slight pressure with gauze or cotton, thus pressing out the excess of fluid from the conjunctival sac, and again instil one or two drops of neo-silvol. As the solution is somewhat viscid, the

patients are apt to comment on the oily nature of the drops; but that is not an undesirable property.

In neo-silvol we possess a bactericidal agent for the conjunctiva that has the following advantages over the other colloidal silver salts:

1. It is non-irritating.
2. It is non-staining.
3. It is possibly somewhat more efficient in acute purulent inflammations of the conjunctiva.

The disadvantages may be enumerated as follows:

1. It is not very stable, requiring a fresh solution every seven days.
2. It is somewhat "sticky."
3. The power of penetration is only superficial.

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### Original Investigation and Comparative Value of Indigo Carmine as a Functional Kidney Test.

HARPSTER, in the *Ohio State Medical Journal* for March, 1922, states that he prepares his solutions according to the methods originally used in the foreign clinics:

Five indigo carmine tablets are dissolved in 100 cc of sterile water and concentrated down to 20 cc over a water-bath and bottled in sterile glass containers.

Twenty cc are then injected into the buttocks, or better resterilized and filtered and resterilized and injected into a vein.

The earliest time of the appearance of the dye was eight minutes. The latest time recorded of the appearance of the dye was fifty-eight minutes.

In a few cases the dye did not appear at all or at least while the patient was under observation, which was probably three hours.

He has come to consider a kidney as normal where the dye appeared in from ten to fifteen minutes. Furniss has a number of times called his attention to the simplicity of the method and the rapidity with which an accurate functional diagnosis can be made.

His usual procedure is to introduce the cystoscope into the bladder, distended with sterile water, locate the ureteral orifices, inject the dye, and watch for the time of its appearance. If the dye appears on the right side in twelve minutes, on the left side in twenty minutes, he accepts the findings as a slight impairment of the left kidney. If the dye appears on the right side in ten minutes and on the left side in thirty minutes or more, he accepts the findings as a serious impairment of the left kidney.

He has repeatedly checked up these cases with phloridzin, phthalein, cryoscopy, and other tests, which only confirm his original opinion. It is not necessary to catheterize the ureters, and one hour or less will complete the examination, while by using all the tests, often an entire day may be consumed in making a functional kidney diagnosis.

Thomas says: "There is one feature of the quantitative employment of indigo carmine which has placed its reliability without a peer, and that is its index of elimination. I believe the index of elimination shows the stability of the kidney function—that is the all-important consideration—more accurately than the mere quantitative output for the first two hours, particularly if the time required for the drug to appear is ignored."

In other words, the time of the appearance of the dye is the vital point, and not the amount of the dye that can be recovered, after two hours' time, from each kidney.

This was the original idea of Richter, Casper, Nitze, and Israel, and has never been improved upon. Thus, when the elimination for the third hour after the injection of the dye exceeds the elimination for the first hour, the patient is said to be in the negative phase, and operation is contraindicated.

On the other hand, when the amount for the first hour exceeds that for the third hour, the patient is in the positive phase, and should be a good operative risk.

The amount of the dye secreted each hour from each kidney can be easily deter-

mined with the indigo carmine colorimeter or index, and, of course, the ureters in these cases must be catheterized.

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### The Use of Pituitrin in Obstetrics.

JOHNSON, in a letter to the editor of the *Medical Record* of March 4, 1922, writes:

"When I first began to use pituitrin in obstetrics I gave it in doses of one cc each, and only to multiparæ who were nearing the end of labor. I soon discovered, however, that the resulting expulsive efforts were unnecessarily violent, so I gradually decreased the dose until now I never give more than two minims as an initial dose, and in some cases I begin with one minim or even one-half minim. Now I use pituitrin for primiparæ as well as for multiparæ, and in the first, second, or third stage of labor, and for the induction of labor, and I have yet to see any evil results from its use.

"Any one can safely use pituitrin if he will get a tuberculin syringe so as to measure accurately the amount given and give a small enough dose. If one minim does not produce a reaction in fifteen minutes it will be safe to give a little larger dose. If the contractions become too strong or too frequent they can be promptly modified by a hypodermic injection of heroin or a few whiffs of ether.

"It is absurd to refuse to use a valuable therapeutic agent just because it has at some time been ignorantly and carelessly used.

"Josephson has deplored the fact that doctors sometimes give pituitrin to shorten labor in order that they may keep appointments with other patients. He apparently ignores the fact that by so doing the doctor not only increases his own usefulness but also shortens the period of suffering for the patient. There are three kinds of obstetricians: One kind stays away until he is told that the patient is about to be delivered or that she is absolutely exhausted and needs his help. Another kind conscientiously stays with the patient hours or days, if necessary, but has too much respect for nature to interfere in any way unless the patient's condition becomes serious. The third kind stays with the patient and does everything possible to shorten the labor and relieve the pain. Which would you choose if the patient belonged to you?

"In my opinion a doctor who would let a woman suffer all day and then use forceps when a small dose of pituitrin would end her torture in half an hour should not have the opportunity to practice obstetrics."

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### The Toxemias of Pregnancy.

MCILROY, in the *British Medical Journal* of March 4, 1922, states that the aim of treatment is to neutralize and dilute the toxins in the serum, and to facilitate their elimination by the normal channels of excretion. Rest in bed is essential in the severe cases, as it prevents tissue waste and favors diaphoresis and kidney excretion. A protein-free diet is essential in most cases, and Tweedy and others have found starvation of benefit in severe cases of persistent vomiting and eclampsia. It must be remembered that this method of treatment cannot be unduly prolonged as there is a possibility that acidosis may occur. It is sometimes possible to follow up the treatment by a carbohydrate and protein diet without much interval.

He says that he cannot lay too much stress upon the importance of attention to the teeth. Pyorrhea should be treated by antiseptic mouth-washes and vaccines, and carious teeth attended to or removed. Experience has shown that the treatment of the teeth gives most satisfactory results in the prevention of the severer forms of toxemia.

Fluids, alkaline if possible, should be given in all cases of toxemia. If the condition is severe, all stimuli such as noise and light should be excluded. Purgation must be used with caution so as not to cause irritation of the bowel wall; the days of drastic treatment by croton oil happily are over. Paraffin for more prolonged treatment is of great benefit, as it lubricates the bowel contents, prevents the ab-

sorption of toxins, and carries down the bacteria in its substance. The colon, which is the main channel for absorption, should be emptied at frequent intervals by enemata given by means of a long rubber tube at low pressure. Intestinal lavage with saline and sodium bicarbonate (℥ij to the pint) is essential in every case, and the slow method of introduction gives the best results, care having been taken to remove the fecal contents from the lower bowel. It must be remembered that such treatment may in rare cases cause uterine contractions and expulsion of the ovum. The continuous drop method of introducing saline and glucose (2 oz. to the pint) into the rectum is of benefit. In severe cases lavage of the stomach, leaving in a full dose of magnesium sulphate, gives good results. Stimulation of the skin is brought about by baths, radiant heat, and packs. Drugs are of little value. For mild cases intestinal disinfectants, such as thymol, creosote, salol, and small doses of calomel, are of benefit. Potassium chlorate gives good results in cases of repeated abortion (Jardine).

Veratrone for the reduction of blood-pressure is advocated, but only one dose should be given. Pilocarpine has been abandoned by most obstretricians as it causes edema of the lungs. The administration of morphine in eclampsia is still a matter of controversy, although the Dublin school by long experience testifies to its good results. It is of great use in diminishing fatigue in cases of prolonged vomiting, and its sedative action undoubtedly outweighs its supposed harmful effects. In some cases of toxemia with high blood-pressure, McIlroy has had good results from the administration of Dover's powder in 5-grain doses. He has had no experience with decapsulation of the kidneys, nor does he consider this treatment advisable in view of more modern methods. Venesection is advocated in eclampsia, and is of great benefit in cases of full pulse and raised blood-pressure. It is contraindicated in cases of anemia and exhaustion, such as is produced by persistent vomiting. Alkalinized saline transfusion is employed as a means of neutralizing and diluting the toxins in the blood stream. Mild cases of toxemia respond readily to treatment, but in the experience of most obstetricians in some severe cases, especially if of sudden onset, all treatment has seemed useless.

The decision as to the advisability of induction of abortion or premature labor is difficult.

Induction is a confession of failure in treatment, and although the toxins are generated in the placenta and therefore removed in most cases by expulsion of the ovum or placenta, it is not always the case that cure results, and it must also be borne in mind that surgical interference carries with it a degree of risk and possibly the termination of the life of the child when pregnancy is advanced. The process of labor throws an additional amount of toxins into the blood stream. In devitalized conditions the risk of sepsis after any manipulative interference is not to be ignored. In conditions such as threatened eclampsia with rising blood-pressure, persistence of albumin in the urine after treatment, or in those in which the urine is diminished or suppressed, induction is indicated. In persistent vomiting, where there is evidence of exhaustion, with signs of liver and kidney destruction of tissue, as in jaundice and vomiting of blood, the termination of the pregnancy is justifiable. In acute conditions labor sometimes occurs spontaneously at the time when the medical attendant is considering its advisability. The administration of an anesthetic calls for serious consideration, owing to the action of chloroform upon metabolism and the edema of the lungs sometimes found after ether anesthesia. If retinal changes occur or opacity of the lens, as in glycosuria, induction should be considered.

The method employed should be determined in each individual case. In early pregnancy laminaria tents may be employed. Premature labor may be induced by bougies or by the introduction of the soft-rubber stomach-tube into the uterus. Abdominal and vaginal Cæsarean section

may be selected for some cases, but these operations are associated with a degree of shock, anesthesia is deep, and the results in severe cases are not always satisfactory.

In conclusion, it must be borne in mind that the main number of severe cases are preventable if treatment can be given in their early stages. Every pregnant woman should be kept under medical observation, and every case of albuminuria should be investigated. The public health authorities should take up the question of toxemia of pregnancy just as they have taken up the question of syphilis. Antenatal beds should be provided in all maternity hospitals. Financial facilities should be given to research workers, especially in the domain of physiology, for the investigation of the normal function of human pregnancy.

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### The Early Treatment of Hyperthyroidism.

GOETSCH, in the *New York Medical Journal* of March 15, 1922, states that in the medical treatment of exophthalmic goitre the same routine holds as in puberty hyperplasia, but is usually followed by much less success. Digitalis has little or no success upon the control of tachycardia. The difference as compared with puberty hyperplasia lies in the fact that in exophthalmic goitre the toxemia is far more severe and permanent damage is very apt to follow if the condition does not react favorably to medical treatment. Bed rest is the most important factor in the treatment of these cases, some of which respond remarkably well to it. Again, there is no specific drug which has proved of value in the treatment of these cases. We know of cases of exophthalmic goitre in which recovery was spontaneous, indicating that when nature intends that these patients shall get well, improvement occurs without medicine at all. However, these cases are decidedly in the minority. Here again one should remember that when patients are not improving it is a grave mistake to allow them to progress to the stage when permanent damage has been done to the nervous mechanism of the heart, the myocardium, the nervous system, the digestive apparatus, and the kidneys. At this stage surgical intervention is attended with considerably greater risk and followed also by less improvement than when operation is undertaken earlier, since the damage done may be to a considerable extent irreparable. He always inquires of patients with early exophthalmic goitre whether they have had the benefit of medical treatment. If in spite of medical treatment the disease has remained stationary with considerable activity still present, or has gotten worse, he advises operation, since this is almost always followed by rapid improvement and by cure in a considerable majority of cases.

In considering adenoma we find the problem a very different one. Here we are dealing with benign pathological new growths, in other words, tumors, of probable embryonic origin and possessing the power of elaborating excessive amounts of thyroid toxin. The thyroid gland as such is, on the other hand, not concerned in the disease. The hyperthyroidism is due to these tumors developing in the gland. It is therefore as useless, to his mind, and with the knowledge we possess at the present day, to try to influence these tumors by giving medicine as it is to attempt the cure of an adenoma of the breast or a myoma of the uterus by medicine. When one or more nodules, even though small, are palpable and hyperthyroidism exists, the treatment is absolutely surgical. There are, to be sure, cystic adenomata of the thyroid which have lost their activity and are therefore unassociated with hyperthyroidism, and which do not demand operation, but in these cases treatment is not necessary since there is no hyperthyroidism arising from the adenomata. Occasionally, for reasons of pressure or cosmetics, such a tumor is removed. In diffuse adenomatosis, medical treatment is not unlike that outlined for puberty hyperplasia. After a considerable trial of three to six months or more and if favorable progress is not gotten, surgery should again be resorted to as the correct form of treatment.

The one form of thyroid disease in which medical treatment has had really striking results is in the treatment of simple colloid goitre, such as is common in young women, in whom we find a mild to moderate enlargement of the gland without symptoms of hyperthyroidism. Goetsch does not discuss this form of goitre because he is dealing with hyperthyroidism in this paper. In the discussion of the medical treatment, however, he refers briefly to the fact that a reduction in size of the goitre is frequently obtained by the administration of iodine in small amounts, iodides such as sodium iodide, or iron iodide, and occasionally small quantities of thyroid extract. Local applications of iodine are also beneficial. This is a different type of goitre in which a mild hyperthyroidism is present and which therefore responds favorably to the administration of iodine. This drug causes an increased activity of the gland with increased absorption of colloid followed by reduction in size of the goitre. This is the type with which Marine, working with the schoolchildren in Cleveland, has had such startling results.

In considering the *x*-ray treatment in goitre-producing hyperthyroidism, he finds that the problem is one of reducing the secretory activity to the point at which there is symptomatic relief for the patient. To gauge the amount of *x*-ray dose as to its penetration and exposure in order to produce just the desired effect has been difficult. We know that, generally speaking, the mild doses have a stimulating effect. Larger doses inhibit, and finally massive doses produce destructive action. The dose and penetration required vary with the types of goitre under consideration, with the degree of activity present and thickness of the tissues of the neck.

The treatment with the *x*-ray is not unattended with disadvantages and with certain risks. He has had patients who have come finally for operation who have stated that after each treatment, which was given weekly, they were extremely nervous, the heart action was rapid, and they suffered with severe headache, vomiting, and almost collapse, necessitating patients going to bed for two or three days after treatment. To be sure the dose was perhaps badly judged, the patient receiving possibly a stimulating dose instead of an inhibiting dose. However, since the dose varies with the patient, with the symptoms, and with the type of goitre, considerable time may be lost and annoyance caused before proper dosage is determined. The treatment is often prolonged, extending over as much as two or three years. It is often expensive, and in the end resort has frequently to be had to surgery. Again, one must remember that in a case which has had prolonged *x*-ray treatment and in which surgery is finally resorted to, the difficulties of operation are considerably increased because of the extensive adhesions produced between the various layers of prethyroid structures and between the sternothyroid muscles and the capsule of the thyroid gland itself.

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### The End Results of Removal of Tonsils and Adenoids.

SINGTON, in the *British Medical Journal* of March 4, 1922, states that so much has been written recently on the subject of the operation for the removal of tonsils and adenoids that there may perhaps seem to be little more which can be usefully added. There is, however, one aspect upon which little, if any, stress has been laid, namely, the general practitioner's views upon the effects and the utility of the operation. It is he who is naturally in the best position to judge the end results, since he is able to observe the patients more intimately and for longer periods than the operator or the consultant can do. Further, it is as a rule the general practitioner who decides as to the advisability of his little patients having their tonsils and adenoids removed, and it is he who has to give the parents the reasons, based upon his previous experience, which lead him to believe that benefit will be derived from the operation.

For these reasons he feels that a summary of the cases which have been under his care during the last few years may serve

a useful purpose. He has included all the children under ten years of age who have had their tonsils completely removed by dissection and their adenoids removed at the same time. The very striking conclusion which this summary indicates is that, once convalescent after the operation is complete, the child's health is so greatly improved that one has hardly ever had to attend him or her again; and that the child is not so liable to other and fresh illnesses as one who retains this lymphatic tissue.

In 24 cases, or 47 per cent, no further attendance was needed. In 5 cases, or 9 per cent, attendances were required for gastric or intestinal disorders only; in 4 cases, or 7.5 per cent, for zymotic diseases; in 2 cases, or 4 per cent, for appendicitis; and in 10 cases, or 19 per cent, for other disturbances unconnected with the throat. Thus there are left only three cases—asthma, congenital heart, and bronchitis—where attendance after the operation for removal of tonsils and adenoids was at all frequent, and in these instances it was very much reduced.

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## Report of a Case of Convulsions in a Child Treated with Luminal.

RAWNSLEY, in the *Journal of the Royal Army Medical Corps* for March, 1922, states that the patient, a little girl, aged ten years, had suffered from convulsions since May, 1920. There was a complete absence of any family history of epilepsy.

The first seizure ushered in a severe attack of whooping-cough at the age of eight and a half years. The attacks were at first only every six weeks almost to the day, and always occurred between 5:15 and 5:30 A.M. and singly. Subsequently the attacks became more and more frequent, until as many as three a day occurred, severe in character and accompanied by much cyanosis.

The patient is a particularly bright and intelligent child, and seemed in no way mentally affected either before or after the attacks.

On account of the inadequacy of all treatment, viz., bromides, arsenic, dieting, etc., it was decided to place the child on luminal, a drug which is now highly recommended for such cases.

On August 14, 1921, this child was placed on luminal. The last attack prior to this new treatment was on August 9, 1921, on which day there were two very severe attacks. The dosage was one grain at night with a weekly purgative. Attacks since have been very mild and few and far between, and in no case has consciousness been lost, and there has been only a trace of momentary spasm in the arms.

On August 22, 1921, there were two such mild attacks at 2 P.M and 5 P.M. Luminal was therefore increased by ½ grain every morning up to September 5, 1921. The child kept absolutely free of all attacks and giddiness. On that date there were two mild attacks of giddiness, and so the luminal was increased by ½ grain, the dose therefore being one grain morning and evening.

During September the child, who is myopic and astigmatic, was seen by an oculist, and her glasses were found to need correction.

There have been further occasional mild attacks of a transitory character with giddiness and slight momentary spasms of the arms, but no loss of consciousness, viz., on September 24, 1921, October 9, 1921, and October 25, 1921; also at intervals, occasional attacks of giddiness only.

The child is now taking luminal in one-grain doses t. d. s., and having a weekly purge. She looks in good health and is attending school regularly.

Luminal or methyl-barbituric acid has a powerful controlling action, as is seen; this is the opinion of other medical men who are using the drug and who have had results similar to the present case.

On August 27, 1921, an article appeared in the *British Medical Journal* headed "Luminal Contrasted with Bromide," by F. Golla, M.D., F.R.C.P., physician to St. George's Hospital, London, who recorded results in about 180 cases, of a like nature to those obtained in Guernsey.

Dr. Golla stated that the drug was apt to

cause giddiness, and in some cases he had been obliged to cease giving it on this account. Their experience locally is that this is an indication to increase the dose, and they have found this symptom then subsides, without ill effect to the patient; on diminishing the dose again they have found that the giddiness recurs.

It would seem therefore that this drug converts "grand mal" attacks into "petit mal" attacks rather than that it is the cause of the giddiness.

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### Bacillus Acidophilus and Its Therapeutic Application.

RETTGER and CHEPLIN, in the *Archives of Internal Medicine* of March 15, 1922, state that the work of the past two years has shown conclusively that B. acidophilus can be implanted in the intestine of man almost at will, and that its colonization there may be such as to displace at least 80 per cent of the usual mixed flora. This transformation is brought about by the administration of at least minimum amounts of lactose or of living acidophilus culture or of a combination of both. The most practical and effective method is by means of the acidophilus milk or of the milk plus definite amounts of lactose given daily. Cases of obstinate constipation almost invariably require some added lactose.

B. acidophilus is, according to all available information, an organism which does not elaborate toxic or other harmful products. It is classed as a strictly nonfermentative and non-putrefactive microorganism. It is present in the intestine of nursing infants in relatively large numbers, and at all times is an inhabitant of the intestine of children of all ages and of the adult. It is demonstrated with difficulty, however, in the feces of persons subsisting on the usual mixed diet of which protein forms a large part, owing to its being suppressed by the other intestinal microörganisms which flourish on the usual mixed diet. Administration of sufficient lactose (or dextrin) stimulates the proliferation of the relatively few aciduric bacilli. Ordinary milk accomplishes the same result, but enormous amounts of the milk are usually required to bring about the change. Pure viable cultures of B. acidophilus accomplish the same thing, with or without added lactose, but when applied alone definite minimum quantities of the cultures or suspensions, which must be determined for each individual, are necessary.

Viable cultures of B. acidophilus when used in sufficient amounts and under the right conditions have important therapeutic properties. They are of particular merit in the treatment of chronic constipation and of diarrheas, as the numerous experiments thus far conducted by them conclusively show. Furthermore, B. acidophilus should be of marked benefit in the treatment of other ailments which are directly or indirectly referable to disturbed function of the digestive system and of the chief organ of elimination; the results already obtained on several individuals bear out this promise.

A word of warning should be sounded at this time. The principle on which the acidophilus treatment is based has been clearly set forth in the various publications from this laboratory. It is only when these principles are adhered to that favorable results are to be expected. In the first place, this is not a cure for all kinds of ailment, nor will all cases of disturbances falling within its category necessarily respond to the acidophilus treatment. In the second place, it is not an elixir in the sense that Metchnikoff's B. bulgaricus was for a while supposed to be. The ingestion of relatively few acidophilus bacilli will not lead to implantation and bodily improvement. A minimum amount of bacterial culture is necessary to bring about these results, and for this reason the writers have adopted the acidophilus milk culture as the surest and most effective means of attaining the desired results. So-called acidophilus tablets and powders can be of no use whatever in effecting transformation of flora and relief from trouble, either when taken as such or when used for the production of acidophilus milk. As has been

fully pointed out elsewhere, the preparation of viable and satisfactory acidophilus cultures is impossible without the absolute sterilization of the medium to be used, and without the aseptic use of pure cultures of the organism as inoculum.

The fullest benefit from the acidophilus treatment can be derived only when the patient is under practically daily observation and when thorough bacteriologic examinations of the feces are made at frequent intervals. These examinations are of extreme importance in determining the amount of acidophilus milk or milk and lactose that is to be taken from day to day. Unless at least a reasonable degree of transformation of the intestinal flora to the aciduric type is effected little should be expected from the clinical standpoint. In any application of the principle of acidophilus treatment immediate results must not always be expected. In a number of instances in which the treatment became effective they have failed to obtain a favorable reaction until after one to two weeks' application, and in certain few cases there was no favorable response until a month after the initial administration of the acidophilus milk or the milk and lactose. This is to be expected when the results to be sought must of necessity be indirect, as in the positive eczema case. Yet such cases may clear up and in the end prove to be some of the most satisfactory.

Various plans are now being considered for making B. acidophilus milk generally available and under such conditions as to assure its viability and purity.

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### Cerebral Embolism Following the Arrest of Auricular Fibrillation by Quinidine.

WILSON and HERMANN, in the *Journal of the American Medical Association* of March 25, 1922, state that although the accidents following the use of quinidine have not so far been sufficiently numerous to contraindicate its use, the possibility of their occurrence must be borne in mind. It would perhaps be best to withhold the drug in cases in which considerable improvement is not to be expected from its use. By the careful selection of cases it is probable that their frequency may be reduced, but it is not likely that they can, for the present, be avoided entirely.

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### Tetanus and Its Treatment.

SMITH, in the *Journal-Lancet* for March, 1922, in concluding his paper, states that a review of the literature and an experience with three cases of tetanus successfully treated, confirms the belief that tetanus antitoxin has a definite value when given intravenously in sufficient dosage.

In determining the dosage the severity of the case should be taken into consideration. For the adult and a severe case it may require from 150,000 to 200,000 units; however, many cases are reported cured with doses ranging from 60,000 to 100,000 units.

The intravenous method is the method of choice, and in an acute case should always be employed. It may be advisable to give 5000 to 10,000 units into the spinal canal at the same time the initial dose is given.

The prophylactic dose of tetanus antitoxin should be at least 2000 units. Statistics from the late war go to prove beyond doubt that it is of great value in the prevention of tetanus, but the fact that tetanus did occur in a delayed type in many cases where it was used adds evidence to the belief that the prophylactic dose of 1000 to 1500 units was not sufficient. As a prophylactic measure it should be more generally used in all lacerated and penetrating wounds and especially in compound fractures. As a prophylactic measure it is not essential that it be given intravenously, but may be given subcutaneously. The time should soon come when all railroad companies and employers of labor will urge its use by the physicians caring for their injured.

If there is an open discharging wound or a healed wound which is sore and painful, the local focus should receive thorough treatment. If the original wound is com-

pletely healed and the scar not painful, he sees no advantage in its treatment.

Symptoms requiring stimulants or sedatives should be treated as they arise. If the cause of the disease is thoroughly treated the symptoms will take care of themselves.

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### The X-ray Treatment of Uterine Fibroids.

The *British Medical Journal* of March 11, 1922, in an editorial on this subject states that none of the applications of *x*-ray therapy are more important or fraught with greater interest than the treatment of fibromyomata of the uterus. While it is true that the method has acquired greater popularity in America and on the Continent, yet British gynecologists are, on the whole, keenly alive to its possibilities and advantages. This was abundantly demonstrated by the joint discussion between the Sections of Obstetrics and Gynecology, and Electro-Therapeutics, at the British Medical Association meeting at Cambridge in July, 1920. Put briefly, the participants in the discussion were agreed upon certain well-defined contraindications to the treatment, and in the assumption that there is a distinct place for the use of *x*-rays in the treatment of selected cases of uterine fibroids. They were agreed that it is unsuitable for women under forty because of the premature and unusually severe vasomotor phenomena found to ensue; for submucous fibroids and very large fibroids of any variety; for cases in which the tumor is undergoing degeneration or complicated by pelvic inflammatory conditions, old or recent, by the presence of malignant disease, of an ovarian cyst, or of pregnancy; and, according to Dr. Herbert Williamson, when the patient is gravely anemic with a red blood cell count of less than two and a half million, and the hemoglobin less than 35 per cent.

In a recent article, Béclère submits the results of 300 new observations on patients whom he had not only examined but irradiated himself, and whose after-history he had carefully followed. A perusal of his article reveals radical differences between his practice and that of his more conservative British colleagues. Thus, of the 300 cases, 49 were below the age of forty. "Time was," he says, "when Roentgen therapy was only admitted in women above forty. It has, however, been abundantly proved that not only below forty but even below thirty years it is followed by the same success as at a more advanced age. The youth of the patient has ceased to be a contraindication." He has not observed any appreciable difference between the natural menopause and that induced by *x*-rays. Indeed, most of the patients afterwards enjoyed better health than for many years, owing, no doubt, to the arrest of hemorrhage.

On this point of the abnormal severity of the artificial menopause Williamson is, however, very emphatic, and states that he has on several occasions seen distressing and prolonged vasomotor phenomena follow the treatment in women under forty, producing symptoms which were not relieved by extracts of the endocrine glands; in three cases he has seen kraurosis vulvæ develop with severe dyspareunia. Such symptoms can, of course, be avoided by hysterectomy with conservation of the ovaries. On the other hand, the views expressed at Cambridge by Dr. Louisa Martindale were in agreement with those of Béclère. She said that "the menopause produced was freer from symptoms than the normal climacteric." And again, *x*-ray treatment "brings about a climacteric involving less disturbance even than a natural one."

According to Béclère, the decision for or against the use of *x*-rays is not to be determined by the size of the tumor; in 159 of his cases it was of such dimensions as to extend to a height varying from 10 to 34 cm. (4 to 13 in.) above the symphysis pubis; compression of neighboring organs, even of the bladder, so far from being regarded as a contraindication, is looked upon as an indication for the employment of *x*-rays. "Size," he says, "is never a contraindication to the use of *x*-rays." In many of his cases

the tumors reached above the level of the umbilicus, while some even extended underneath the costal margin. He recognizes, however, that in the case of such large tumors diminution in size can only be expected to reach a point at which it becomes just bearable to the patient, and that in such cases surgical interference gives a more complete result. The patient should be informed of the relative advantages of both methods, and allowed to choose. But if operation is contraindicated or is refused, "the largest myomas may be treated with success by Roentgen therapy." Thus Béclère's position on this point does not differ very materially from that of his British colleagues.

The "aseptic degenerations"—myxomatous, calcareous, and necrobiotic—Béclère does not look upon as contraindications. Of conditions in the tumor itself, "only septic complications, torsion of the pedicle, or grave hemorrhage necessitate surgical intervention, whilst all the other conditions, formerly looked upon as contraindications, can no longer be considered as such."

In Béclère's experience the only risk attending the treatment is the possibility of producing a form of dermatitis which might be followed by trophic disturbance of the skin of the abdomen. It is a danger easily avoided by using a proper method and precise dosage. In none of his 300 cases did he observe the least cutaneous accident, except temporary brown pigmentation, which he looks upon as a normal phenomenon. Sometimes on the same day or the day after the treatment the patient suffered from a condition resembling seasickness — the "Roentgenkater" of the German radiologists, called by the French "mal des rayons." Only exceptionally did it end in vomiting, and in no case did it necessitate the patient remaining in bed.

In view of results so excellent, obtained by a technique admittedly in many important respects imperfect, it seems strange that radiotherapy has not been more widely and generally adopted in this country for the treatment of uterine fibroids, more especially as it seems probable that, with increased experience, the results would rapidly improve. We know of famous British schools of medicine in which the only resort in the treatment of fibroids is still surgical operation.

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**Serum Treatment of Lobar Pneumonia.**

McGuire, in the *Boston Medical and Surgical Journal* of March 23, 1922, states that before administering serum it is necessary to determine whether or not the patient is sensitive to horse serum, by carrying out appropriate skin tests. Patients who are sensitive must be desensitized before serum treatment can be carried out with safety.

A large number of physicians do not type the pneumonia.

If serum therapy is to be employed, it is absolutely imperative that all cases of lobar pneumonia be typed. Ordinarily there is sufficient time to send the sputum to the laboratory and wait for a report, if this is done when the patient is first seen. Only in an exceptionally severe case should serum be given before the type is determined. Such determination takes on the average about twelve hours. Where sputum could not be obtained he has often resorted to lung puncture in the consolidated lung area to obtain a culture of the organism, and he has never seen complications result from such a puncture.

Some use a so-called "polyvalent serum" and not a specific Type I serum.

To mention the so-called "polyvalent serum" is to condemn it. There is no excuse for its use. Up to the present time a serum of sufficient potency to be of curative value has not been developed except in Type I; therefore the use of a mixed or polyvalent serum is not warranted.

It is to be remembered that Type I antipneumococcic serum is standardized and must have a definite protective power before it is distributed for therapeutic use. The Rockefeller Institute has adopted the standard that 0.2 cc of antipneumococcic serum must regularly protect against at

least 0.1 cc of a culture which is shown by animal tests to be of proper virulence. The standardization tests are carried out by inoculating mice. So far it has not been possible to produce a serum in the other types of pneumonia which has sufficient protective power to warrant its use.

The following series of 35 cases include all the Type I pneumonia which occurred in his service at the Naval Hospital, Chelsea, Massachusetts, as well as cases treated in private practice since leaving the service:

No. cases, 35; white count average, 26,000.

No. deaths, 2; amount serum average, 205 cc.

Mortality, 5.7 per cent; complications, empyema, 2.

Febrile period, average, 66 hours.

Two deaths occurred. One was due to empyema five weeks after the patient had recovered from pneumonia. This patient responded promptly to serum treatment. His temperature became normal in a few hours following a single injection of serum. In a few days empyema developed, for which a rib was promptly resected. The empyema proved fatal.

The other death occurred in a young man who was admitted to the hospital with all the symptoms and signs of lobar pneumonia. His sputum showed Type I pneumococcus. His throat culture was positive for diphtheria and streptococcus hemolyticus. He was given diphtheria antitoxin followed by two injections of Type I serum, and apparently recovered, for his temperature, pulse and respiration were normal on the fourth day. On the fifth day his symptoms began to return. He received four more 100-cc injections of Type I serum, but did not respond to treatment. An autopsy showed a diffuse bronchopneumonia of the lower lobes of both lungs, hypostatic pneumonia of right upper and middle lobes, with 150 cc of sanguineous exudate in the right pleural cavity. Whether this patient actually died of Type I pneumonia seems questionable, as the autopsy report showed a broncho and not a lobar involvement.

The normal mortality of Type I pneumonia is 25 to 30 per cent. The mortality in this group of 35 serum-treated cases was 5.7 per cent. In a series of 22 cases of Type II pneumonia in the same class of patients during the same period, there were six deaths, a mortality of 27 per cent, which is about the normal.

In 495 reported cases of Type I pneumonia treated with serum there was an average mortality of 10.5 per cent. These included many cases treated late in the disease.

The average duration of the pneumonia in this series of 35 cases as determined by the temperature and symptoms was 66 hours; in other words, the time from the initial chill and fever until the temperature was again normal was less than three days. The course of the disease was thus decidedly shortened. In the majority of the cases the fever ended by crisis. These patients were practically all treated during the first or second day of the disease and none later than the third day.

By itself this series of 35 cases is too small to arrive at definite conclusions, but when taken in conjunction with the other groups of reported cases collected from literature, it furnishes additional evidence of the value of the serum treatment of Type I pneumonia.

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### The Effect of Alcohol on Gastric Digestion.

The *British Medical Journal* of March 18, 1922, in an editorial on this subject, states that this would at first sight appear to be a well-worn line of research, and indeed this is shown by the list of 182 references attached to Aksel O. Haneborg's thesis in English on the effects of alcohol upon digestion in the stomach, which contains the results of work carried out in the Physiological Institute of the University of Christiania and in the hospitals of that city. Much of the physiological work in the past has been carried out with commercial pepsin *in vitro*, and hence Haneborg's experiments performed on healthy persons and patients

with various disorders approach much more closely to those of ordinary practice. These show that 75 per cent of alcohol, taken in the proportion of 0.5 cc per kilo of body weight, is absorbed from the stomach in half an hour, and that after the lapse of an hour from the time of taking it alcohol has practically disappeared from the stomach. Very little alcohol when taken in this amount passes into the small intestine. The alcohol undergoes combustion within three or four hours, and only 0.1 to 0.5 per cent of that consumed is excreted in the urine.

It is rather surprising to find that chronic gastritis does not interfere with the absorption of alcohol from the stomach. By giving alcohol in test meals to patients with gastric disorders an attempt was made to determine the indications and contraindications for alcohol in these diseases; but as the secretion of gastric juice depends on a number of factors, the effects of which at any given moment it is difficult to control, final conclusions require a very large series of observations. Alcohol increases the secretion of gastric juice probably by its action on the nervous system after absorption, but the physical effect of alcoholic drinks, produced by sight, smell, and taste, appears to be less important than might be expected. There is a difference between the action of pure alcohol, on the one hand, and of beer and wine on the other; thus, beer and wine retard digestion because their salts neutralize the free hydrochloric acid; but later, when absorption into the blood has occurred, there is an increased secretion of gastric juice, as in the case of pure alcohol. Indirectly, by increasing the amount of hydrochloric acid, alcohol in certain cases increases the rate at which the stomach is emptied.

In hyperchlorhydria and ulcer alcohol is clearly contraindicated, but in conditions with deficient secretion it is of use, though not in complete achylia. After the age of fifty years there is deficiency of free HCl in 30 to 50 per cent of ordinary persons, and though with suitable food no symptoms of discomfort should arise, an unsuitable diet readily has this effect, which may be alleviated by alcohol. Haneborg, however, considers that his observations tend to lower the former reputation of alcohol as a stomachic, and insists that there should never be more than ten per cent of alcohol in the gastric contents, otherwise the pepsin is affected. This is surely so large a proportion that it can seldom be reached if the alcohol be taken at a meal. In carcinoma of the stomach alcohol may relieve pain by its narcotic action, and retard fermentation in patients with pyloric obstruction; better results, he says, are obtained with whisky and brandy than with wines and beer.

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### The Clinical Value of Radium in the Management of Uterine Hemorrhage.

POLAK, in the *Medical Record* of March 25, 1922, states that during the past six years he has been using radium almost daily, with more or less success. Their follow-up system has given them the opportunity to see the results, modify the indications, and limit the forms of application.

There is a decided difference in the application, as well as in the results, when the radium element is used and when the emanations are used. Intensive radium treatment, with one or two grammes of radium element, does not enter into this discussion. The results have been obtained by the use of from fifty to one hundred and fifty milligrammes of radium element.

Myopathic hemorrhages in young girls are frequently excessive, and sometimes yield to the internal administration of endocrines and regulation of the lower bowel. When the bleeding has continued for any length of time, the endometrium becomes hypertrophied, the uterus large and soft, and the os is very likely to be open. These cases were formerly curetted after all other forms of internal medication had failed, and a secondary anemia had been induced. After curetting there was usually an amenorrhea for a month or two, when this was followed again with a metrorrhagia. This same case treated by radium, for from 300 to 600 mgm. hours, with the radium properly filtered with glass, silver,

and brass, and this covered with rubber, which practically cuts out all of the alpha and beta rays, will establish a normal menstruation after one séance. Once only has there been occasion to repeat the exposure. In this class there were 31 cases treated, the average dosage was 400 mgm. hours, and only one application was given in 30 of this series. The results show that the quantity of the menstruation was regulated in every instance, except one, which required two subsequent applications. The last was followed by amenorrhea for one year, when the menses were established and recurred regularly. Six of these girls are married, and two have become pregnant, a fact which answers some of the criticisms which are made of using radium in young girls.

Radium will control the hemorrhage of uterine myomata and in a large number of cases will reduce the size of the tumor, provided the tumor is intramural or submucous, and not pedunculated. Nevertheless operation is still the procedure of choice in most myomata, as the indications for radium are limited and it has certain definite disadvantages, for while it controls bleeding, and in the majority of cases reduces the size of the tumor, nodules outside of the uterus may be left without a blood supply and consequently are more likely to give trouble. Further, malignant complications, already in the tumor, may be overlooked, for it has been shown that sarcoma is found in serial section in about 9 per cent in submucous tumors—consequently we can lay down the dictum that radium is never permissible in submucous growths or unless a diagnostic curettage is possible, for while remarkable results have been shown following radiation of cervical cancer, body carcinoma is not amenable to the effects of the rays.

Again, about 54 per cent of all fibroids are complicated by some form of tubo-ovarian disease, consequently many of these intrapelvic complicating lesions are missed, and while the tumor is shrunk and the hemorrhage is controlled the associated lesions help to keep up the patient's invalidism.

Radiation, when applied in sufficient dosage to check hemorrhage and shrink the tumor, will seriously impair the reproductive functions in young women, and therefore should not be used as a procedure of choice in this class of cases.

One of the symptoms of fibroid which requires treatment is the pressure symptom —here the effect of radium is too slow to relieve the conditions which intraligamentous growths produce on the ureters and blood-vessels.

The immediate effect of radium is the production of edema and excitation of inflammatory reaction; hence, in the presence of old inflammatory adnexal lesions, this reaction becomes more marked.

Finally, radiation will increase the necrosis in tumors which are already necrotic, and by added acidosis increase the toxemia of the patient.

Against these disadvantages radium has certain definite advantages in the treatment of fibroid tumors, particularly if proper selection is made. These advantages are:

First, there is no operative mortality. There is no general anesthetic. There are no postoperative complications, and there is prompt control of uterine hemorrhage.

Second, should radium fail, operation is always possible.

Third, the menopausal symptoms are not so marked.

Fourth, in intramural tumors we can not only expect absolute cessation of the hemorrhage, but shrinking in the tumor in over 65 per cent of the growths.

Fifth, radium is the procedure of choice in myomata complicated by heart disease, extreme anemia, diabetes, and chronic nephritis.

He has confined radiation in fibroids to those tumors which are not larger than a four-months' pregnancy, where the growth is definitely intramural, and there are no subperitoneal nodules of any considerable size; and to those submucous tumors which, after careful examination under anesthesia, are shown to be sessile.

In all 106 of these growths have been treated by radiation. These patients have had from 2000 to 3000 mgm. hours; the

radium element has been applied directly to the interior of the uterus, the alpha and beta rays have been excluded by proper filters. He has the follow-up records of all of these cases, and only two have needed subsequent operation; in these, both large submucous tumors, the bleeding recurred, and on operation it was found that the tumors had undergone a marked edema.

In 104 the bleeding ceased and has never recurred, after the first menstruation, which was more profuse in a number of instances than some of the previous bleedings. This, in turn, was followed by a serosanguineous discharge, which persisted for several weeks. In 80 of these tumors the growth has shrunk to less than half of the original size, and in 20 it has entirely disappeared.

The largest class of cases which come for relief are the bleedings resulting from subinvolution and fibrosis of the uterus without lateral or posterior parametritis, or a history of pelvic inflammation.

He and his associates have seen and applied radiation to 260 women who can be included in this class. There have been no failures to check the bleeding, and the majority of these uteri have, after a period of several months, become senile in character, and menopausal symptoms have appeared. Several in this class which were associated with prolapse have subsequently been operated upon, and the uterus interposed under the bladder, with resulting cures of the descensus.

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### The Influence of Various Factors on the Excretion and Decomposition of Hexamethylenamine.

HANZLIK and DE EDS, in the *Journal of Pharmacology and Experimental Therapeutics* for April, 1922, state that the quantitative excretion of hexamethylenamine in human individuals was found to be rather variable, ranging from 32 to 82 per cent. The excretion lasted from twenty to thirty-three hours with 1-gramme doses and about forty hours with 5-gramme doses of the drug. The total excretion was uninfluenced by diuresis, but was augmented (up to 100 per cent) by the previous administration of bicarbonate, indicating that the acidity of the gastric contents is an important factor in the decomposition of the unexcreted portion.

Decomposition with liberation of free formaldehyde in tissues appears improbable, since only very low concentrations of formaldehyde dialyze and can be removed by aeration from neutral and slightly acid (pH 7 and 6.4), and none from alkaline, mixtures of hexamethylenamine and serum and plasma previously incubated for various periods at 38°.

Free formaldehyde was not demonstrable in the blood of animals receiving large doses of hexamethylenamine intravenously. Accordingly, therefore, a rational basis for the alleged benefits of hexamethylenamine intravenously in the treatment of pneumonia and other specific infectious diseases is lacking.

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### Slipping Rib.

DAVIES-COLLEY, in the *British Medical Journal* of March 18, 1922, states that abnormal mobility of the lower intercostal joints, causing painful symptoms, is not a rare condition, and it is curious that it should receive no mention in the modern text-books of surgery—at least he has failed to discover any reference to it in the numerous volumes that he has consulted. It is for this reason that he reports two cases which have come under his observation during the past year.

Slipping rib, as it may be called, is a trivial enough complaint in itself, but it gives rise to the most irksome symptoms, and his two patients were quite incapacitated by the excruciating pain which followed any attempts to do manual work. The pain is described as of a sharp, stabbing nature, giving place after a few moments to a dull ache, which lasts for a considerable time, any may, indeed, persist throughout the day, only disappearing after the night's rest. In its position at the costal margin it resembles that due to so many deeper lesions, both of the abdomen and thorax, and he thinks it is quite likely that many

cases occur in which such an apparently unimportant cause as a movable rib cartilage is unsuspected, and the diagnosis is missed. It was so in one of his cases, but the difficulty here was partly due to the fact that the patient, a woman, was known to have had definite abdominal disease in the past, and to the natural tendency to attribute subsequent symptoms to this disease; still, had he been acquainted before with slipping rib as a cause of abdominal pain he thinks that he might have arrived at a correct diagnosis somewhat sooner than he did.

The treatment is simple, and consists in resection of the loose terminal portion of the rib cartilage. In both of his two cases this was followed by immediate and lasting relief of the symptoms.

# Surgical and Genito-Urinary Therapeutics

**Treatment of Tuberculosis of the Spine.**

COLE (*Minnesota Medicine*, Vol. V, No. 1) observes that the principles which underlie all local treatment are evident. There must be removal of weight-bearing and prevention of flexion of the spine; there must be fixation, which need not always be absolute; and lastly, any deformity or caving in which has already occurred must be prevented from increasing and, if possible, corrected. This latter point, the correction of the deformity, is frequently overlooked, but unfortunately must be applied in the majority of cases, for examination of case-histories shows that about the most common symptom for which children are brought to the clinics for treatment is "lump in the back."

Chief of the general measures, aside from the usual fresh air, dietary and hygienic regimen used in all tuberculous cases, is heliotherapy, and no discussion of the treatment of tuberculous spondylitis would be complete without a short elucidation of this procedure. The principle is to build up the fighting powers of the body by carefully graduated exposures, so as to prevent burning, to the direct, unfiltered rays of the sun. The active rays are in the ultraviolet part of the spectrum and usually cause deep pigmentation of the skin. Apparently the resistance to the infection is in direct relation to this pigmentation, for a patient who reacts quickly to the exposure and tans and pigments heavily can be given a much better and shorter prognosis than one who does not react so strongly. One frequently sees, for example, patients with multiple discharging sinuses whose resistance is very low, and in whom it seems impossible to get more than a very faint degree of pigmentation, even after many months, until suddenly the condition changes for the better and deep tanning then occurs.

Other general measures in use, besides the heliotherapy, are tuberculin therapy, the Roentgen ray, and numerous forms of special lights devised to act as local sterilizing agents and in the same manner as sunlight. Of these measures the use of the Roentgen ray seems to be the only one of established value, and there is no doubt that the more universal use of this therapeutic agent would hasten the recovery of many cases which have been suffering for months or years from discharging sinuses.

The local treatment, the principles of which have been already mentioned, must not be ignored while applying the above general measures, but must be rigidly applied from the first. This treatment varies with different cases and should be more radical in adults than in children. Children can be cured by conservative measures and the function of the spine in many of these cases not permanently interfered with. That is, there is a complete and absolute cure. This is not the case with adults in whom there is always a

definite decrease in the function of the spine, with ankylosis between a certain number of the vertebræ even in the cured cases.

All acute and subacute cases should be treated in absolute recumbency, preferably on a gas-pipe frame. This frame is made of galvanized gas-pipe and should be from four to six inches longer than the patient and just the width of the shoulder-joints, or about four-fifths the width of the body. The importance of this last measurement is frequently overlooked, and the result is a wide frame upon which it is impossible to keep the patient properly.

Cases with very acute and severe symptoms, or those with paraplegia, especially if the disease is situated high up in the spinal column, will frequently need additional treatment for a time, consisting of direct head traction by means of the weight and pulley. Counter-fixation must of course be used to prevent the patient from being pulled off the frame.

With the application of a properly fitted and prepared frame the symptoms of spinal disease subside almost immediately, and a pitiful, suffering child will in a very few days be bright and cheerful.

The routine care of patients undergoing the above treatment is very important, and nurses and parents must be carefully instructed in their management. Daily, without fail, the child must be taken from the frame and the back cleaned and rubbed with alcohol. In order to prevent any flexion of the spine the child is removed by turning the frame over so that he is lying on his abdomen on the bed, the aprons or retaining straps having first been loosened. If possible, another frame should be in readiness so that the old frame need not immediately be cleaned up. This is of especial value in an institution, as much time can be saved by this method.

As the cure progresses the child can be allowed to spend several hours a day lying on its abdomen, there being no attempt made to keep the spine absolutely rigid, flexion only being prevented.

After from six to eighteen months, depending on the duration and severity of the case and the number of vertebræ involved, it is time to very gradually commence ambulatory treatment. Here again, as with the recumbent treatment, there are many types of apparatus to be used, probably the most efficient being a plaster-of-Paris jacket of the Calot type—that is, a jacket which, even with low lumbar disease, extends over the shoulders and around the neck. With disease higher up the chin and occiput or even the entire head must be included in the plaster. These jackets may be used from the very beginning of the treatment in place of the gas-pipe frame if desired, and with a very large pear-shaped window cut out over the chest and abdomen anteriorly and a small rectangular window over the deformity posteriorly, this deformity can be markedly helped.

The minimum total time for active treatment must be about three years, unless the case was an old one before coming under observation. This ambulatory treatment must last for many months. The jacket must be changed at intervals, and toward the end may be replaced by a removable jacket or back brace. When cure is apparently complete the brace or apparatus being worn can be removed at night and used only during the day, and then later it is also gradually removed for increasing lengths of time during the day. Cure can only be finally ascertained by a long trial period without support, substantiated by the radiographic evidence.

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### Alimentary Infections in Chronic Arthritis.

Mutch *(Lancet,* Dec. 17, 1921) considers this subject in a communication based upon an analysis of 200 personally investigated cases, of which half were hospital patients and the other half private patients, so that many different walks of life were represented. Gout, venereal or tuberculous disease of the joints, and all cases of monarthritis have been excluded, but no

other selection has been exercised, and, with these exceptions, the cases may be regarded as consecutive. Although uniform infection of the whole alimentary tract is never encountered, multiple areas of infection are often found. They can be divided roughly into an upper zone which includes the mouth and throat, and a lower one which comprises the bowel and its appendages. In the present series active sepsis was present in the throat and nose in 34 per cent of the cases, and around the teeth in 52 per cent, whilst infective streptococci were recovered from the feces of 84 per cent.

Doubtless at times much injurious infection takes place from the tonsils and jaws, but the invasion from the bowel is of a much more serious nature. Numerous instances can be found in which chronic arthritis has commenced many years after the extraction of all the teeth. This had occurred in 15 per cent of the present cases, the period which had elapsed between the extractions and the onset of arthritis varying from two to twenty years, and the average time being eleven years. It is clear that in these patients invasion of the joints must have taken place from some other mucosal focus. Another 16 per cent had had total extractions done during the course of the arthritis and yet continued to have outbursts of arthritis with the involvement of fresh joints. Almost all the extractions had been done for gross septic conditions. Critical analysis of the throat histories shows a similar state of affairs. Four per cent of the patients had had their tonsils enucleated many years before the onset of the arthritis, and another 5 per cent had received no benefit from enucleation carried out during the course of the disease. The remaining 91 per cent still possessed their tonsils. If this inquiry is taken one step further it is easy to find patients with continued arthritis who are both edentulous and devoid of tonsillar tissue. The explanation of the failure in the treatment of these patients lies in the infection which was taking place from the lower zones in the bowel and which had been neglected during the cleansing of the mouth.

Anatomically the lower zones of infection can be divided into two groups. In the first group are localized infections. Mechanical agents, such as hard feces, obstructions, stasis, ptosis, and distention with gas produce loci of depressed resistance through attrition, local poisoning of the mucosa, and interference with the flow of blood and lymph. In these places infective bacteria establish areas of chronic infection in the wall of the bowel. Stercoral ulcers, diverticulitis, ulcerated piles, and chronic appendicitis are common examples of this type of infection. In the second group there is a diffuse infection which sometimes involves the whole intestine from duodenum to rectum, and may or may not be associated with circumscribed zones of special activity such as have been placed in the first group.

Most of the infections are streptococcal, but a few are staphylococcal. In the present series the latter were only 4 per cent of the whole.

In this widely distributed group are included infections by many different types of streptococcus, and only 6 per cent of the present series were hemolytic. In about one-third of the cases abnormal forms of the colon bacillus of the non-lactose-fermenting or late-lactose-fermenting varieties were found in association with the cocci. In the diffuse infections the streptococci are distributed along the alimentary tract in a definite pattern. In the pelvic colon they are much less numerous than the colon bacillus. In the ileocecal region they become more conspicuous and at the higher levels are usually present in pure culture.

Chronic infections do not arise in the normal alimentary tract. Derangements, often of a very gross nature, were traced in more than 90 per cent of the present series.

Stagnation is almost universal. Three-quarters of the patients had suffered from constipation for many years prior to the onset of the arthritis, and in almost one-half of these cases the constipation had been

very severe. As measured by means of an opaque meal and *x*-rays, stasis was found as commonly in the small bowel as in the large. In the colon it occurred in 89 per cent of cases, the average time taken for the evacuation of the greater part of the meal in these cases being more than three days, while in some instances a week was required. In the ileum stasis was found in 90 per cent of cases. In these the average time required for the ileum to empty, after all the barium had left the stomach, was eight hours, whereas under normal circumstances only three and a half or four hours are needed. Stasis was not so common in the stomach and occurred in only one-third of the cases. The average time taken for the meal to pass through the stomach was eight hours, or twice the normal time. In many of the patients repeated overloading of the colon over a period of years had led to compensatory hypertrophy with elongation. Three-quarters of the patients had long redundant loops of pelvic colon, and in two-thirds the transverse colon was doubled in length and hung in a tortuous festoon across the abdomen. Many patients had developed secondary obstructions which aggravated the primary stasis. One-half of them had a kink in the splenic flexure in the erect posture, and as many as 90 per cent had a "last kink" in the pelvic colon. The appendix was examined at all laparotomies and whenever the opaque meal entered and displayed its shadow on the fluorescent screen. It was abnormal in three-quarters of these cases. Sometimes it was the seat of chronic inflammation, but more frequently it was fixed to the posterior abdominal wall and acted mechanically by interfering with the passage of the food through the last coil of ileum.

Ptosis had occurred with great frequency to the hindrance of peristalsis and the free flow of blood and lymph.

Ferment action was commonly defective and digestion slow, so that much unassimilated food found its way into the large bowel, where it formed a suitable nidus for bacterial activity. The production of an excess of gas affords the most direct evidence of such activity, and 130 of the patients complained of this undue flatus in the colon. A similar proportion complained of gastric symptoms which were of many different kinds and varied in severity from heartburn and nausea to vomiting and acute epigastric pain after meals.

Apart from bacteriological analyses much direct evidence of infection of the colon was forthcoming. Intermittent looseness of the bowels, short attacks of severe diarrhea, and the repeated passage of mucus were of common occurrence, whilst in a small minority of cases persistent diarrhea replaced the more usual constipation.

Study of this series has shown again and again that stasis and sepsis can exist in the intestine and yet not be manifest without investigation. The bowels may act every day in spite of serious delay in the colon. The residues from the meals of the preceding twenty-four hours are not evacuated, but are stored up by such patients and passed out at the forty-eighth or seventy-second hour, as the case may be. The colon always contains the accumulated débris of two or three days' meals. In other cases the latent stasis is in the ileum, where the food may be retained for twice the normal time before it is passed into the cecum. Such a delay does not of necessity interfere with the regularity of defecation or give rise to discomfort in the abdomen. Marked stasis of these types is at once brought to light by systematic radiography, but cannot be detected readily in any other way. Sepsis in the bowel is just as frequently masked. Even extensive invasion of the bowel by infective bacteria such as streptococci does not always produce diarrhea or any other sign of irritation. The true nature of these can be detected only by serological tests and the examination of cultures of the stools.

In brief, it can be stated that stasis often occurs in the colon although there is a daily evacuation; stasis often occurs in the ileum, even when the patient does not refer any

symptoms to the alimentary tract; streptococcal infections are often present in the bowel, although there are no symptoms of irritation of the colon, and extensive infection of the ileocecal region does not always lead to the excretion of living streptococci in the feces.

The condition of the alimentary tract dominates the outlook in rheumatoid and osteoarthritis. The general scheme employed in the treatment of the present series of cases has been as follows: The entire alimentary tract was surveyed carefully in each case and an estimate formed of the relative degrees of septic absorption occurring at the various levels. The more accessible areas of infection in the jaws, throat, and intestines were treated surgically, and all the disorders of the digestive tract which had encouraged the development of chronic infection were dealt with. Autogenous vaccines proved of great value when used to supplement these measures. They were prepared from infective bacteria of all the principal zones of sepsis. Streptococci obtained from different foci in the same patient usually vary in their cultural characters, and each strain was included in the vaccine. Chronic infection frequently damages the thyroid gland. In the present series minor forms of subthyroidism were very common, whilst well-defined myxedema or goitres of considerable size were seen in 14 per cent of cases. There is an intimate association between immunity reactions and the functions of the thyroid gland. The dry extract of the thyroid was given in all such cases with great benefit to the joints. Accurate diagnosis, aided by radiography and bacteriology, makes radical treatment and cure possible. In the present series of cases which have been followed for varying periods up to nine years, 89 per cent show very great improvement or complete arrest. Of the failures one-quarter had received very partial treatment only and could not be inoculated with vaccines. If it were possible to exclude those cases in which circumstances such as age, temperament, and position in life prevented the full use of radical methods, the results would have been still more encouraging.

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### Tuberculous Empyema.

HEDBLOM *(The Journal-Lancet,* Dec. 15, 1921) observes that positive proof of the tuberculous nature of a purulent pleurisy is afforded by finding the bacilli in the exudate by direct examination, by a positive animal inoculation, or by a demonstration of the characteristic tubercles in the excised pleura. In the ordinary case, therefore, a presumptive diagnosis must be made on the clinical history of the case, the character of the exudate, and the recognition of a tuberculous process in some other organ.

A family history of tuberculosis is of some value. Cabot showed that at the Massachusetts General Hospital in a series of 300 patients with pleurisy 67 per cent, who later developed tuberculosis, had a positive family history, while only 25 per cent of those who remained well had such a history. An insidious onset without a preceding infectious disease, especially if accompanied by fever, night sweats, loss of weight and strength, loss of appetite, and progressively increasing nervousness, is always suggestive of tuberculous infections. A history of preceding pleurisy with effusion, even though years before, affords grounds for the suspicion that a later idiopathic empyema may be tuberculous. A history of pleurisy with serous effusion in an adult should be evaluated equally with that of an hemoptysis (Lemon).

The presence of a tuberculous lesion in other organs, notably in the lungs and in the peritoneum, lends weight to a presumptive diagnosis of the tuberculous nature of coexisting empyema. Osler states that the pleura is always involved in pulmonary tuberculosis. Effusion complicating a therapeutic pneumothorax or following a spontaneous pneumothorax, even if pyogenic organisms are found on culture, is probably tuberculous. A sterile purulent

fluid, especially in the presence of fever and a low leucocyte count, is almost certain to be tuberculous.

The relative incidence of tuberculous empyema as reported in the literature varies from 3 to 19 per cent in thirteen series of cases. In about 360 cases of empyema at the Mayo Clinic since 1910, sixty-one (about 17 per cent) were more or less definitely tuberculous. It is entirely probable that the incidence is considerably higher than this.

There is much evidence to indicate that a pleural effusion is a conservative condition so long as the exudate does not become large enough to interfere with respiration or circulation. The fact, however, that the improvement often observed in cases of pulmonary tuberculosis after effusion develops is not proportionate to the amount of fluid nor to the time it has been present seems to show that this improvement is not mechanical, but due to a biologic process of much importance; further, there is evidence to show that a serous effusion after repeated aspiration is more apt to become purulent, and consequently chronic, in its further course. Clinical experience has also shown that the removal of a small amount of effusion is often followed by further rapid spontaneous absorption, while the aspiration of large amounts may lead to rapid reaccumulation.

Aspiration of a large amount of effusion with consequent expansion of the lung may be distinctly injurious in the presence of active pulmonary tuberculosis, while a collapsed, splinted lung may be very beneficial. From these considerations it seems very doubtful that it is ever advisable to aspirate a serous effusion unless it is causing dyspnea, cyanosis, or a rapid pulse.

A patient with a sterile purulent exudate should be treated on the same principles as one with serous exudate. Patients with pus in the pleural cavity are, unfortunately, very liable to become the victims of injudicious surgery. This condition represents an exception to the rule, *ubi pus ibi evacua*, for the simple reason that there is no pus in the sense in which the word is used in this hackneyed phrase. A sterile pleural effusion, like a cold abscess elsewhere, should be aspirated, and if the pus reaccumulates an extrapleural rib resection is indicated to collapse the chest wall without opening the pleural cavity. Open drainage always leads to secondary infection. These are the cases in which later operation seldom cures and in which the postoperative mortality rises to 80 per cent. A mixed tuberculous and pyogenic infection in a closed cavity, especially if there is marked sepsis, on the contrary requires prompt drainage, either by the open method or by the closed, with Dakin's solution irrigation.

It cannot be overemphasized that the open drainage operation is contraindicated in cases of sterile tuberculous empyema. It will introduce a secondary infection, and the sinus will not heal. In forty-one (55 per cent) of the cases in this series drainage had been done elsewhere. In thirty-one cases primary drainage was instituted at the Mayo Clinic either for an overwhelming infection or for a perforation into a bronchus.

The decortication operation is probably rarely advisable in cases of tuberculous empyema. First, the chance of a cure is relatively poor because of the presence of fibrosis limiting the expansibility of the lung; and second, if the lung is able to expand there is danger of lighting up a pulmonary focus. In this series the operation was performed in six cases; in all before the tuberculous nature of the empyema had been recognized. These cases have been reported elsewhere in a larger series. A secondary operation was later required in five.

In plastic operations a skin flap, a skin muscle flap, an extensive Schede, or an extrapleural rib resection—all have their indications. For a small draining, infected cavity, resection of the entire chest wall over the cavity with a skin-flap plastic operation after the method of Beck is probably best. For large cavities of very

long standing, with greatly thickened pleuræ, and marked deformity of the ribs, a Schede operation, preferably in stages, is indicated. For all sterile undrained cavities and for large open cavities without undue thickening of the pleura, operation in several stages involving the resection of segments of the ribs of from 6 to 15 cm. through an incision parallel with the vertebral column and close to it, resulting in a very marked collapse of the chest wall, and consequent diminution in the size of the pleural cavity, is indicated. If the cavity is not wholly obliterated a resection of the cartilage of the upper ribs through an incision parallel with the sternum results in further narrowing. If necessary, a modified Schede operation can be done on any residual cavity. This operation carries with it a minimum of risk and a maximum of chest wall collapse, and, consequently, a large percentage of cures. In this series a plastic operation was performed in twenty-two cases.

The end-results are known in sixty-seven of the seventy-four cases. Fifty-eight and two-tenths per cent are cured, or much improved; nearly 4.5 per cent are not improved; and 37.3 per cent are dead; 14.9 per cent died within two months of operation.

Of the patients definitely proved to be tuberculous, 61 per cent were cured, or greatly improved; 39 per cent died; the operative mortality was 21.7 per cent. In patients with clinically tuberculous empyemas, in whom the results are known concerning fourteen, 50 per cent were cured or much improved and 50 per cent died; the operative mortality was 21.4 per cent. In patients with empyema associated with pulmonary tuberculosis, about 57.1 per cent were cured or much improved, and 14.3 per cent not improved; 28.6 per cent died; the operative mortality was 4.7 per cent. In patients with empyema following pleurisy with effusion, about 66.7 per cent were cured or improved; 33.3 per cent died; the operative mortality was 11 per cent.

**Sacral Anesthesia in Urology.**

SCHOLL (*Journal of Urology,* Volume VI, No. 2, 1921) notes that Cathelin, in 1900, was the first to use the sacral canal as a means of inducing anesthesia. He injected cocaine in the caudal foramen in dogs suspended by their hind legs, and produced an extensive anesthesia. He was unsuccessful in anesthetizing the sacral nerves in human beings. Stoeckel, in 1909, utilized sacral anesthesia for surgical procedures. Lewis and Bartels, in 1916, reported 85 cases in which sacral anesthesia was used. In 48 of 68 cystoscopic examinations it was satisfactory. Pickens, in 1916, reported 81 perfect results in 100 cases. Lynch, in 1918, used the method in 80 cases with sixteen failures.

Sacral nerve blocking was introduced into the Mayo Clinic in 1920, by Labat of Pauchet's Clinic, Paris. Labat has demonstrated that satisfactory anesthesia can be obtained for operations on the pelvic organs and for urologic examinations. A correct administration of the anesthetic for any type of case requires a study of the sacral foramina, the ligaments, and the pelvic landmarks.

The structure of the sacrum is especially suited to nerve blocking, owing to the fact that all the foramina open into the main central canal, and fluid introduced through any of the openings will reach most of the sacral nerves.

The patient is placed face downward, with hips elevated on a pillow. This accentuates the bony landmarks and stretches the sacral ligament through which the canal is entered. The horizontal position permits the most effective effusion of the fluid through the entire canal, and, as shown by Labat, some of the fluid escapes through the anterior foramina and saturates the sacral plexus, which is on the anterior aspect of the bone. The sacral hiatus, which is at the apex of a small triangle, is palpated at the lower end of the sacrum; the other angles are formed by the sacral horns. The hiatus is readily located by sliding the finger from the tip of the coccyx

and following the gluteal fold until the converging sides of the apex are encountered. A depression covered by an elastic membrane may be felt on palpation. A small intradermal wheal of novocaine is infiltrated over the opening through which a thin spinal puncture needle is introduced. The needle passes through the skin and ligament at right angles and should pierce the ligament about 0.5 cm. below the apex of the triangle. A definite snap is felt when the needle passes through the ligament. The shoulder of the needle is then lowered until the shaft is approximately parallel to the sacral canal. The needle enters readily, and is gently and slowly, with a small amount of force, insinuated along the sacral canal. In most cases the needle strikes the anterior wall of the canal after it has entered about 2 cm. Depressing the shoulder, or using the finger as a fulcrum placed on the needle 1 cm. from the skin and elevating the distal end, will also elevate the point of the needle into the center of the canal. This, and rotating the needle so that the bevel of the point is parallel to the anterior wall of the canal, will, in most cases, permit the introduction of the needle to a sufficient distance into the canal—that is, from 4 to 5 cm. The correct insertion of the needle through the membrane is the most important step in entering the canal. About 30 cc of novocaine solution is injected, the needle being slowly withdrawn during the latter part of the injection. If force is not used in inserting the needle there is no possibility of breaking the shaft. A comparatively new needle should be used and the stylet left in place until the needle is completely inserted.

It is possible to enter practically any sacral canal except those that are abnormally or traumatically distorted. In stout persons the landmarks are often obliterated, and it is necessary to feel with the needle point in the subcutaneous tissues until the familiar fibrous sensation of the membrane is encountered. Such persons generally have a thin sacral ligament, and if it is located the canal may be easily entered, the injection in most cases resulting in satisfactory anesthesia. Partially ossified membranes are not infrequently encountered, but in most instances are readily punctured. Suchy found ossification of the membrane in 3 of 172 patients. The most common cause of difficulty in entering the canal is an extreme curvature of the lower sacral segments. This is more common in men than in women.

The canal grows smaller as it curves downward toward the hiatus; in most cases it is sufficiently large, but anatomic variations are common, and occasionally it is difficult or even impossible to enter it a sufficient distance to produce anesthesia.

The needle should enter the canal 4 cm. or 5 cm.; it should pass freely, with a certain amount of lateral mobility; if it is kept in the midline there is very little danger of striking the sacral nerves. The dural sac ends near the second sacral vertebra and is continued as the film terminale. In an average of 14 dissections Thompson found that the distance from the end of the dura to the sacral ligament was 5.8 cm.; the shortest was 4 cm., and the longest 7 cm. There is always the danger of entering one of the sacral veins or the dural sac. On this account, after the stylet is withdrawn, it is advisable to wait a few seconds for the appearance of blood or spinal fluid. If spinal fluid appears, the needle is withdrawn until the flow stops; if blood appears, the needle is washed and partially withdrawn, or redirected. Zweifel reports a death caused by the injection of 0.8 gramme of novocaine into the dural space. Spinal fluid appeared and the needle was withdrawn, but insufficiently; death occurred ten minutes later from heart and respiratory paralysis. Goldenberg mentions a case in which the full dose was injected into the dural canal without causing trouble, save a complete anesthesia of the lower half of the body for forty-eight hours. Injection into the blood stream may cause collapse and dyspnea. Krönig reports a case of partial respiratory paralysis following an injection into a sacral vein.

The solution of novocaine should be made up fresh for each case. The novocaine,

in combination with sodium bicarbonate and sufficient sodium chloride to give a normal salt solution, is kept in powders.

Sodium bicarbonate, 0.15;
Sodium chloride, 0.10;
Novocaine, 0.60.

Thirty cubic centimeters of distilled water is brought to a boil in a glass flask over an alcohol lamp; the flask is removed and the powder dropped in. The solution is then brought to a boil and allowed to cool. Six-tenths of a gramme of novocaine in 30 cc of water makes a 2-per-cent solution. The addition of sodium bicarbonate, as advised by Läwen and Gros, makes a strongly hydrolyzed solution which diffuses more readily through the nerve sheaths and produces an anesthesia of greater intensity and longer duration than that with novocaine alone. After the addition of the powder the solution is not allowed to boil for more than a few seconds since the acid bicarbonate readily changes to the strongly alkaline carbonate. Schlimpert has demonstrated the effects of the alkaline carbonate on the skin of laboratory animals. Injections of the acid bicarbonate were innocuous, but after three minutes of boiling similar injections produced gangrene. The bicarbonate by itself is apparently harmless, and Eggleston and Hatcher have shown that in combination it does not increase the toxicity of novocaine.

After cooling the novocaine bicarbonate solution, from 6 to 8 drops of adrenalin, to 1000, are added; the adrenalin delays absorption; the amount of anesthetic in the circulation at one time is kept below the amount sufficient to cause toxic symptoms, and it also increases the anesthetic action of the solution by permitting the novocaine to remain in contact with sacral nerves for a longer time.

The solution, when injected, should meet with very little resistance. The sensation of being injected into a free space should be felt. If force is necessary the point of the needle may be buried beneath the periosteum and should be readjusted. Läwen emphasized slow administration. It tends to diminish the amount of anesthetic taken up by the blood stream, and further, if force is not used, the solution will remain in the lower part of the sacrum in contact with the sacral nerves.

During the course of the injection the patient may complain of a slight sense of fulness over the sacrum. This sensation is transient and merely indicates that the solution is being retained in the sacral canal, and in most cases assures a satisfactory anesthesia. Directly after the injection the patient is allowed to sit up in order to hold the fluid in the pelvis in contact with the sacral nerves. On account of the low permeability of these nerves it is necessary to wait for from ten to twenty minutes before complete anesthesia is obtained.

The anesthesia first appears in the anoscrotal area in about four minutes. It radiates from this point and in ten minutes covers the posterior surface of the scrotum and the penis; laterally it has spread out from 10 cm. to 12 cm. on the inner surface of the thighs; posteriorly there is complete relaxation of the sphincter and with an area of anesthesia covering the sacrum and buttocks. The anterior urethra is anesthetized in from ten to twelve minutes. The meatus and internal sphincters are generally the last to become anesthetized. In most cases the intensity of the anesthesia gradually increases, reaching its maximum in from twenty to twenty-five minutes. In testing for anesthesia it is often found, especially in apprehensive patients, that while sensation from superficial stimuli partly remains in the skin of the perineum there is at the same time an excellent anesthesia of the urethra and bladder.

The bladder and urethra are supplied by two sets of nerves, the sacral and the sympathetic, both of which contain afferent and efferent fibers. The sacral branches are the most important, they form the hypogastric plexus which ramifies over the bladder, supplying the unstriated muscles of the bladder, urethra, and corpora cavernosa; other branches from the sacral plexus, especially the pudics, form the motor path to the striated muscle of the urethra. The sympathetic branches are of less import-

ance. According to Head they arise from the lower thoracic and upper lumbar roots, passing through the splanchnic nerves to the inferior mesenteric ganglion, then through the hypogastric nerves to the bladder. Blocking the sacral nerves in most cases produces complete anesthesia of the bladder and urethra, but in an occasional case distention gives moderate pain. As brought out by Head this pain, from prolonged distention or overdistention, is referred along the course of the last thoracic nerve root and consequently is not affected by sacral nerve blocking. This accounts for the occasional occurrence of pain on overdistention even after complete anesthesia of all the sacral nerves.

Six-tenths of a gramme of novocaine induces a sufficient anesthesia to permit a urologic examination in most cases, but larger quantities are frequently injected to induce anesthesia for other conditions. Suchy sometimes gives as much as a gramme. Novoçaine injected into the sacral canal is more toxic than when injected into the subcutaneous or muscular tissue. Läwen and von Gaza have shown that while 0.1 gramme for each kilo injected intramuscularly into laboratory animals causes no effect, a similar amount injected extradurally causes a rapid fall of blood-pressure, cessation of respiration, and death.

If an immediate anesthesia is desired, or if a simple caudal injection is insufficient, the lateral sacral foramina may also be injected according to the method of Labat. The openings for the second sacral nerves are the largest and most readily located. They are just medial to and slightly below the posterior superior iliac spines. A small intradermal wheal is made over the foramen and from 3 cc to 5 cc of novocaine solution are injected through a fine needle in the immediate vicinity of the nerve as it leaves the canal. The foramen for the first nerve is from 1 cm. to 1.5 cm. above the second nerve, and the foramen for the third nerve is from 1.5 cm. to 2 cm. below. If the caudal opening can be entered it is not necessary to inject into an opening below the second nerve. The lower sacral nerves pass a longer distance through the sacral canal, and consequently are bathed more deeply in the anesthetic. If it is not possible to enter the sacral hiatus it is necessary to inject all the lateral foramina. A line passing through the center of the first and second foramina passes through the third foramen 1.5 cm. below the second nerve and through the fourth 1 cm. below the third. The fifth nerve is generally found immediately above the sacral horns.

One of the most desirable features of sacral anesthesia is the absence of after-effects. Schlimpert noted in 570 cases from the Freiburg Clinic, in many of which high sacral injections were given for abdominal work, the almost total absence of postoperative vomiting or headache. In 1000 injections Cathelin saw no case of infection. Presumably sacral anesthesia is harmless and can be repeated if necessary.

Most writers report a fairly high percentage of failures. Failure is often due to technical errors. The needle may pass over the dorsum of the sacrum and may not enter the canal. When this happens, an injection of the fluid produces edema of the overlying tissues. The needle may be inserted too low, pass through the sacrococcygeal cartilage, and enter the pelvis, or, if pushed far enough, may pierce the rectum, or it may be so low as merely to pierce the membrane, striking the bone below; this does not allow sufficient room to turn and direct the point up the canal.

In cases in which high anesthesia is attempted the percentage of failure increases. Suchy reports 172 cases of general pelvic and abdominal surgery with 106 successful results. In high extradural anesthesia larger amounts of the anesthetic are used and the injections are made with the patient in the knee-chest position, which permits the solution to flow from the sacral hiatus up the spinal canal. Schlimpert and

Schneider noticed anesthesia to the nipple line in some of their cases.

In the Mayo Clinic 150 anesthesias were found necessary in the cystoscopic examination of more than 2600 patients. One hundred and forty of these anesthesias were satisfactory. The remaining ten were considered failures. The failures were due, in seven cases, either to individual resistance to novocaine, or to errors in technique; in two cases to anatomic deformities of the sacrum; and in one case to the extension of a malignant process into the sacral canal.

Sacral anesthesia has been found valuable in the examination of contracted irritable bladders, particularly those of tuberculous origin. The insertion of radium needles into malignant prostates, fulguration of tumors of the bladder, urethral and ureteral dilatation, litholapaxy, and other operations have been readily carried out under this anesthetic. The greater number of patients were given merely a caudal injection, 30 cc of a 2.0-per-cent solution of novocaine being injected into the canal through the sacral hiatus. In cases in which the single caudal injection was insufficient, the lateral sacral foramina were also injected.

The successful application of sacral anesthesia requires careful attention to details. The patient must be in the correct position, the solution must be of the right dilution and amount, and the injecting needle must be accurately placed. If properly administered it is an efficient anesthetic, sufficient in intensity and duration to permit the carrying out of almost any urologic procedure.

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### Forty-two Cases of Hip Fractures.

MOORE (*Boston Medical and Surgical Journal*, Dec. 8, 1921) regards his method as an adaptation of the abduction cast advocated by Whitman, which enables the patient to maintain a sitting position throughout convalescence, with the leg immobilized. He reports some forty-two patients; six were in such poor physical condition when seen that any treatment seemed inadvisable. Five died a few days after injury, while the sixth is still living. These patients were seen mainly in private practice since 1912. They were all treated by the author himself. Convalescence was frequently cared for by the family physician as hospitalization was not needful as soon as the patient became used to the cast.

It is conceded by most surgeons that the fractures involving the great trochanter will unite by bony union under any circumstances provided the patient survives treatment. This is probably due to the fact, as shown by Lexer's study of the blood supply of the head and neck of the femur, that the blood supply to the proximal fragment in this type of fracture is little impaired. Disability in these cases is due to faulty position, adduction or coxa vara and loss of muscle balance. It is also conceded that with early recognition, proper reduction and immobilization, non-union and imperfect function are extremely rare in children and young adults. Except in rare cases of general systemic disease, any method of treatment is well borne in the young. Bony union is the usual result even in the intracapsular fractures; joint and muscle function are quickly reëstablished after treatment.

The real problems in the treatment of hip fractures are those that occur in patients past middle life, especially in the intracapsular type of fracture, either impacted or loose. A certain small percentage of this type of cases are healthy and robust and will tolerate any method of treatment. The majority, however, have a low reserve of energy, their physiologic balance is unstable, either as a result of senility or as more often occurs from systemic disease, to which the aged are prone. They are overwhelmed by the injury, grave symptoms of shock are presented, and uremia or other systemic conditions develop. If active measures are not instituted at once to combat these symptoms hypostatic pneumonia soon supervenes with the usual fatal result. In the past it has been these types of cases that have

made up the large majority of hopeless hip fractures. They have received either no treatment or treatment of the most perfunctory sort, and have been doomed to an early death or invalidism for the rest of their days. The old ultraconservative rule of "treat the patient, then the fracture" has been followed with the result that the immediate mortality has remained unchanged and the percentage of lifelong invalids is little lower than fifty years ago.

These are the types of patients for which the method of treatment to be described was devised. The cases here reported were in no way selected, but through good fortune they were in most instances the type of case suited to prove the efficiency of the method. The average age of the forty-eight patients was sixty-five years and four months.

The essentials in the successful treatment of fractures deserve particular emphasis in the handling of hip fractures. No fracture of a long bone in the body results in so great immediate mortality or so high percentage of disability following treatment. Early recognition and treatment are most essential to good functional results and should now be obsolete topics in surgical literature. Broadly speaking, the lack of observance of these principles is the cause of many poor results in the treatment of hip fractures. In an analysis of one hundred and twenty cases of ununited hip fractures treated at the Mayo Clinic, Henderson states that "non-union in the majority resulted from incorrect diagnosis at the time of accident," and "in none of the cases in this series was there a history of really proper treatment for the fracture."

No fracture with replacement of the fragments gives a high percentage of good results if untreated for two or three weeks after injury. Industrial surgeons have shown that many of the crippling injuries of the hand are due to unrecognized and improperly treated fractures.

The question of reduction of hip fractures is still open. Certain factors enter into these fractures, especially in the aged, which obtain in no other long bone: absorption of the ends of fragments in loose fractures, poor reparative function of the bone, and tearing of blood-vessels with destruction of the remaining blood supply to the proximal fragment during reduction.

The ideal reduction of fractures is reposition of the fragments to their original anatomical position. When this position is not attained we fail in accomplishing the ideal. In hip fractures, especially in the aged, the ideal reduction is frequently not obtained owing to the poor condition of the patient and the chance of non-union following disempactions.

Treatment should be based primarily upon the patient's condition to withstand manipulation and the application of apparatus. Secondly, the amount of deformity accepted as an indication for corrective measures should be in direct proportion to the age of the patient.

After reduction, the maintenance of the fragments in apposition is the primary object for which every method of treating hip fracture was devised.

All methods of treatment embodying a splint applied to the leg alone and not attached to the pelvis, as in the Jones abduction splint, fail to immobilize the upper fragment constantly.

If we accept the premise that immobilization of the fragments after anatomical reposition affords the ideal conditions for union, then all methods such as splint and traction to the leg, sand-bags, etc., which do not fulfil these requirements, should be discarded in hip fractures, provided the patient can withstand treatment.

The methods advocated by Sir Robert Jones and Whitman, similar to all of the older methods, require that the leg be placed in the same plane as the trunk—*i.e.*, that the patient be either in the reclining position or standing. As few patients after a hip fracture are strong enough to assume the upright position, practically all are of necessity kept in bed. Prevention of complications incident to bed treatment of the aged is attained by raising the head of the bed and frequently turning the patient from one side to the other. Many patients,

especially the young and robust, bear bed treatment well; the aged and infirm frequently are found to be poor subjects for those methods of treatment.

The first patient upon whom this method was used was a man of seventy-eight having an extracapsular fracture. He was seen the day of his injury. He had incontinence of urine, was rather nervous and tremulous, and appeared to be a poor risk. Under ether the fragments were reduced and the leg drawn down until it was the same length as the other. The thigh was then flexed at right angles with the trunk, the leg flexed at right angles with the thigh, and both thighs abducted as far as possible. Strong upward traction was then maintained by an assistant upon the injured thigh and cast applied from well above the rib margin to the calf. The patient was returned to bed in the sitting position. The next morning he was placed in a wheel chair, where he spent every day thereafter during what was an uneventful convalescence except for incontinence of urine, which persisted for a few weeks, necessitating the application of a new cast at the end of three weeks. The results obtained were so gratifying that since then the author has used this method as a routine in all cases in which any treatment seemed justified.

In 1912 the idea occurred to the author that he might so apply a cast that the patient could sit up in the chair with the leg immobilized during the entire convalescence.

There were twenty-five good results in the series of forty-two treated cases, about 60 per cent; eleven poor results with two deaths during treatment; six untreated and four not heard from. Of the twenty-five good results fourteen were impacted, six loose intracapsular fractures, and five extracapsular. The intracapsular fractures deserve mention, as the results are suggestive of the value of impaction as an aid to union in hip fractures. In the aged this type of fracture with much shortening and deformity was reduced. The reduction was accomplished by traction and "molding;" great care was exercised not to "break up" the fracture.

Of the loose intracapsular fractures occurring in this series, six died as an immediate result of the injury, one was untreated and is still living. Of the treated cases there were six good and six poor results, about 10 per cent lower than the impacted fractures; one was not heard from.

In regard to the application of the cast, it was found that application down to the calf of the leg resulted in an unpleasant edema of the leg and foot. The cast has since been extended down to include the entire leg and foot to the toes. Placing the foot in inversion in the cast seems to have a beneficial effect on the position assumed after treatment.

After reduction strong upward traction and extreme abduction are made beneath the calf, while the cast is applied down to the hand of the assistant making the traction. The cast is allowed to "set" before traction is removed. By this means the fragments are held in apposition during the application of the cast and they remain immobilized throughout treatment. Backward displacement or rolling of the trochanter, which Whitman has mentioned in the application of his cast, is automatically corrected by the position in which the leg is placed in applying the cast.

Stiff joints and contractions following this method of treatment, as possible complications mentioned by Cotton and Whitman, have occurred in but one case of the forty-two treated cases here reported. In this case the cast was removed by the family physician and no attempt made to extend the leg.

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### The Management of the Third Stage of Labor.

DUFFEE *(Ohio State Medical Journal,* January, 1922) quotes Dr. DeLee to the effect that accidents during the third stage are responsible for more fatalities than those of the other two stages combined. He adds that upon the proper conduct of the third stage depends the woman's freedom from postpartum hemorrhage and the smooth convalescence of the puerperium.

Polak, in 1915, after a study of two thousand cases concluded that there is a normal mechanism of the third stage. He states that most of the accidents and complications are directly incident to attempts at expression before complete separation of the placenta has occurred.

Acting upon the knowledge that the third stage is of tremendous importance to the patient, having a direct bearing upon her complete and uncomplicated recovery from this confinement, and therefore also upon her future health, the Department of Obstetrics of the Ohio State University has formulated and followed a method of management of the third stage.

This method is based on the physiological separation of the placenta, no attempt being made to hasten this separation, and strictest asepsis is maintained throughout.

The steps in the management are as follows:

The hand of an assistant follows down the fundus as the child is born and afterwards guards but does not massage the uterus.

After the cord is clamped and cut that portion of the cord without the vagina is laid across the groin of the mother.

No attempt is made to express the placenta until the signs of separation appear. These signs are rather definite and are: (*a*) A lengthening of the cord outside the vagina. (*b*) A distinct rising of the uterus in the abdomen, in most instances accompanied by a slight toppling to the right. (*c*) A change in the shape of the uterus, the change being from a globular to a pear shape and an anteroposterior flattening.

Upon the appearance of the signs of separation the uterus is pushed into the midline, grasped firmly, and steady pressure made downward, not squeezing the uterus but using it as a piston to push the placenta ahead of it.

As the placenta appears at the outlet it is supported and lowered gently into a sterile basin.

The membranes are not twisted, but are delivered in much the same manner as one would remove gauze packing from an abdominal wound. That is, a fold of the membranes is picked up with a sterile forceps and gentle traction is made. If there is no resistance, traction is continued until the membranes are delivered. If there is resistance, that fold is dropped and another tried, and so on until finally a portion is found that yields to gentle traction, and the membranes are in this manner teased out.

All the clots are expressed from the uterus.

The vulvæ are cleansed and covered with a dry sterile pad.

The vaginal canal is never invaded after delivery of the placenta unless absolutely necessary.

The placenta and membranes are carefully examined for missing portions.

An analysis of 325 cases conducted under this management in the clinics of the Ohio State University shows the following:

Longest third stage, 50 minutes.

Shortest third stage, 4 minutes.

Average third stage, 16¾ minutes.

Largest amount of hemorrhage, 39 ounces.

Smallest amount of hemorrhage, 10 8/10 ounces.

There were no cases of postpartum hemorrhage.

There were no cases of retained portions of placenta or membranes requiring manual removal.

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### Intraspinous Treatment of Neurosyphilitic Patients.

MARTHENS (*Ohio State Medical Journal*, January, 1922) describes his routine method of treatment characterized by most careful supervision. He states that because of the difficulty of finding the veins, due to the sclerotic condition so often found in general paralysis regardless of age, deep intramuscular injections of arsphenamine were given from which abscesses often developed. The same conditions developed after

deep intramuscular injections of salicylate of mercury. Therefore this method was also eliminated. The following is the routine treatment adopted:

First, inunctions of 33⅓ per cent mercurial ointment, 7½ grains to the dose, thirty doses; second, potassium iodide 15 minims three times a day, increasing the dose one drop per day; third, six intravenous injections of arsphenamine beginning with 0.3 gm. intravenously and increasing to 0.5 gm. at weekly intervals.

In cases in which the intravenous method cannot be used, the rectal method of administration has been apparently successful, for which the following is the technique:

An aqueous solution composed of sodium hydroxide and arsphenamine is made the same as for the intravenous medication, except that to each 0.5 gm. of arsphenamine 30 cc of water is added, instead of 150 cc, as in the intravenous administration.

The patient has the usual gastrointestinal preparation and, in addition, the lower bowel should be cleansed by an enema. A No. 20 F. catheter is used and inserted high up. There has been no complaint of bowel irritability. At present this method in certain types of office work is used with good results. It is advisable to have the patient lie down for a half-hour afterwards. In the clinic the patient is kept in bed all day.

At first only a dose of 0.5 gm. arsphenamine was used in the rectal treatment; later this was increased 0.5 gm. each week until 2 gm. were given at a treatment. Ninety-eight have been given.

Mehrtens, of San Francisco, uses neoarsphenamine, increasing the dose gradually to 4 gm. by rectum. His conclusions are as follows:

The absorption and distribution are controlled by the determination of the quantity of arsenic in the blood, urine, and spinal fluids, after each method of administration.

Arsenic is absorbed in the blood after such injections, and larger quantities are eliminated in the urine than after ordinary intravenous injections of arsphenamine.

Arsenic persists longer in the blood in perceptible quantities after the rectal method with large doses, than after ordinary intravenous methods.

About equal concentrations in the spinal fluid are obtained by either method. The seventh week a spinal puncture is made and fluid withdrawn for laboratory examinations and a treatment given. Even though the tests are negative no harm has resulted from administering fortified salvarsanized serum. If the spinal tests prove negative, treatment is discontinued for thirty days. A blood Wassermann is then made and, if positive, treatment is resumed; if negative, the patient is given a three months' rest. At the expiration of this time a second blood Wassermann is made, and whether positive or negative, treatment is continued.

If the spinal fluid findings were positive, after some consideration as to the number of treatments and how often they should be given, it was decided to give a treatment of arsphenamine, either intravenously or by rectum every two weeks and the following day an intraspinal. If the laboratory findings become negative, the treatments are discontinued; otherwise a series of ten are given before the patient is given a rest.

If the slightest trace of albumin or sugar is present in the urine, treatment is discontinued until this condition clears up.

One-half hour after an intravenous injection has been given to the patient who is to receive a spinal treatment, blood is withdrawn from an arm vein into a sterile tube which has been rinsed in 0.85 salt solution to prevent hemolysis.

The blood is allowed to stand for one-half hour at room temperature; then the clot is loosened from the tube by a sterile stirring rod. The tube is placed in an ice-box for three or four hours, after which the serum is poured off into a sterile centrifuge tube which also has been rinsed in sterile 0.85 saline solution. The serum is centrifuged for ten minutes; then the serum is poured into other tubes and centrifuged again for

the same period of time. This method of pouring off the serum has been adopted instead of using a pipette, and a centrifuge tube with a very pointed base is used.

After the second centrifuging the serum should be free of red cells. The serum is then poured into a test tube and the desired dose of salvarsan or mercury added. For the preparation of the fortified salvarsanized serum a solution of saline and salvarsan is made, of which 1 cc represents mg. 1 of the drug. The desired dose is added to about 10 cc of serum. The minimum is mg. 0.1, increasing with each successive treatment from mg. 0.1 to ¼, ⅓, 0.4, to mg. 5, the maximum dose. For mercurialized serum a solution of bichloride of mercury is prepared, of which each cc represents gr. 1/100 of the drug. The desired dose, gr. 1/100 the minimum dose, or gr. 1/50 the maximum dose, is added to 12 cc of serum together with 0.85-per-cent saline solution made with double distilled water. Thus the whole amount of fluid given equals about 30 cc. The serum is then inactivated at 57° C. for one-half hour and administered to the patient in less than one hour after inactivation.

At the beginning of the intravenous treatments, which are given on Monday mornings, seven patients had to be carried to the clinic, others had to be restrained in order to receive treatment. During the year 1064 treatments have been given with no severe reactions and no deaths.

Five hundred and thirty spinal treatments were given without serious reactions and no deaths; 460 were of fortified salvarsanized serum, 70 of mercurialized serum.

Cases of general paralysis and tabes have the greatest involvement of the spinal fluid. At some time the tabetics show a typical paretic curve in the colloidal gold test.

A sufficient degree of improvement is reported to justify the author in the following conclusions:

All cases of neurosyphilis should receive the benefits of intensive intraspinal therapy.

The incidence of improvements after treatment is greater than the ordinary remissions characteristic of paresis.

Paretics show a greater degree of improvement after the administration of mercurialized serum than of fortified salvarsanized serum. Mercurialized serum seems to be contraindicated in tabo-paretics.

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### Splenic Syndromes.

Mayo (W. J.) states *(Surgical Clinics of North America,* Volume 1, No. 5, 1921) that even when splenectomy results in alleviation of symptoms, or in cure, we are by no means convinced that the spleen was the cause of the ailment. He speaks of five syndromes in which the spleen may play a major rôle.

The most interesting of the splenic syndromes are those which concern the blood. The blood may be looked on as tissue in the form of fluid, instead of a connective-tissue medium, its function being to carry oxygen and food to the tissues, to remove from them the ash and waste products, and, in addition, to carry noxious agents of all sorts which may gain entrance to the blood, to the kidneys, mucous membrane, and skin for elimination, or to the vital laboratories, of which the liver is chief, for defense. The spleen, considered from this broader conception, is concerned with the purification of the blood, and is one of the agents whereby worn-out red blood-cells and infectious or toxic material of various kinds are filtered from the blood-stream and directed to the liver, the great metabolic and detoxicating organ of the body. In other words, the function of the spleen and the pathologic misfortunes which it sponsors concern chiefly the blood-stream. It would appear that the spleen is not the principal agent, but that it is rather an agent of destruction through which the damage is brought about.

Four of these syndromes—splenic anemia, pernicious anemia, hemolytic icterus, and polycythemia — concern the erythro-

cytes, and one, splenomyelogenous leukemia, concerns the leucocytes.

He gives the histories of six of the patients on whom he has recently operated because of syndromes connected with the pathology of the blood. He gives the history of a case of splenic anemia which after a brief period characterized by loss of weight and a feeling of fulness in the epigastrium following meals and a dull aching pain on an empty stomach, reported for an examination which revealed palpable lymph-nodes in the cervical region and prominent epigastric veins. The diagnosis of splenic anemia was given; the patient was splenectomized. The liver was moderately cirrhotic. The patient in three months had regained his former vigor, was normal in six months, and returned to his work.

The second case was one of syphilitic splenic anemia. There was a suggestive history and a positive Wassermann. There were marked abdominal ascites, edema of both legs, and a huge spleen. The diagnosis was syphilitic hepatitis, with splenomegaly. The spleen was removed, the liver was found to be cirrhotic, and about half its normal size. This patient died six weeks later. She had had a vigorous course of specific treatment for two years.

The third case was one of pernicious anemia, the prominent symptom being one of weakness. The spleen was palpable. Transfusion seemed of little avail. After splenectomy the patient gained 20 pounds in weight and the blood count improved. This improvement was transitory, and he returned to the clinic with hemoglobin of 10 per cent and erythrocytes 750,000. He was treated by transfusions.

Guffin and Azlapka traced 50 patients who had been splenectomized in the clinic for pernicious anemia four years before, and found that 21.3 per cent lived more than three years after operation, and 10.6 per cent more than five years. The average postoperative life was more than two and a half times as long as a comparable group of non-splenectomized pernicious anemia. It would seem that the spleen was not the cause of the pernicious anemia, but rather an agent of destruction; that the formation of erythrocytes was defective, and as one of the functions of the spleen is the destruction of worn-out corpuscles, these subnormal corpuscles, the best the patients could produce, were unnecessarily sacrificed. The removal of the spleen checked the unnecessary destruction of blood. Three deaths occurred in the first 19 cases of splenectomy for pernicious anemia in the clinic. These patients were operated on during crises and while they were on the down grade. All the patients operated on since that time (39) have recovered from the operation. Splenectomy should be done while the patient is on the up grade, such as following blood transfusion.

The fourth case was one of hemolytic icterus. The patient came to the hospital jaundiced and with the complaint of a dull aching pain in the left side, which had persisted for years. There was also a history of attacks of severe pain lasting over a few hours to several days accompanied by nausea and vomiting, followed by jaundice and dark-colored urine. The spleen was low, extending from the left iliac fossa to the umbilicus and easily palpable. The color index was high, but the blood-stains did not show the characteristic signs of pernicious anemia; the reticulated cells were numerous. Diagnosis was made of hemorrhagic jaundice and gall-stones. At the time of splenectomy the gall-bladder was found distended with stones and there was also much bloody serum in the abdominal cavity, the spleen, and gall-bladder; the left Fallopian tube, which contained a ruptured extrauterine pregnancy of about nine months, was also removed. The convalescence was uneventful.

The fifth case was one of primary polycythemia. The patient gave a history of bronchial pneumonia, tonsillitis, rheumatic fever, bilious attacks since childhood, and a severe attack of jaundice. He also had symptoms suggesting perforation of gas-

tric ulcer and some hemorrhage from the stomach and bowel. An enlarged and densely adherent spleen was removed. Mayo's comment on this case is to the effect that polycythemia (rubra vera) is not a common disease. This case fulfils all the clinical criteria. The hemorrhage from which the patient suffered shortly before the operation was very severe; the spleen as well as the erythrocytes was conderably reduced as a result. At the time of the operation the blood count showed that he had gained considerably. Careful examination of the abdomen during the operation did not reveal a lesion other than of the spleen. A specimen removed was negative except for mild hepatitis.

It has been believed that the enlargement of the spleen in polycythemia has no particular significance, for when the patients die terminal pathologic conditions are found in other organs. But this case, while it does not permit generalizations, leads us to suspect that the spleen plays a much greater part in the disease than has been credited to it, and that early in its course the conditions found in the other organs at necropsy do not exist. One may well believe that the adult function of the spleen in destroying erythrocytes is much reduced in cases of polycythemia, and that its internal secretion greatly overstimulates the bone-marrow in the production of the erythrocytes. The patient was in excellent condition when last observed in November.

The sixth case was one of myelogenous leukemia. The major complaint was one of enlarged spleen. Splenectomy and cholecystectomy for gall-stones were performed. Mayo's comment on this case is to the effect that if a patient with leukemia were splenectomized he would die at once, or if he did recover, he would not be benefited. However, it is a common experience that any reduction of the size of the spleen reduces the number of leucocytes and improves anemia. In his series of 27 cases of splenectomy for leukemia there was only one death, and that from pulmonary thrombosis two weeks following operation. They reduce the size of the spleen and the number of leucocytes by radium, which has a remarkable effect. When the leucocytes have been reduced to less than 20,000 the spleen can be removed without difficulty. In some cases they have been able by the use of radium temporarily to reduce the leucocytes from several hundred thousand to less than 5000. Several of these splenectomized patients have now lived more than five years following operation; all have shown temporary marked improvement, and were made much more comfortable. The expectation of permanent cure of leukemia by splenectomy is slight, but the operation has a field of usefulness in selected cases.

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### Treatment of Acute Gonorrheal Rheumatism.

WRIGHT *(Urologic and Cutaneous Review,* March, 1922) contributes an article on this subject which is briefly summarized with the statement that the primary focus must be removed, that splints and plaster are unnecessary, and that vaccines if used in large and repeated doses give beneficial results. He holds that acute gonorrhea is a self-limiting disease and that the patient should go to bed and remain quiet. He would put every patient with rheumatism in bed. He holds that the need for rest of the joint is thus secured. Moist heat is the best form of local application to any form of inflammation; he therefore applies hot wet packs. Also, he favors Bier's bandage. In the later stages he sometimes employs splints and extension. He notes that a single streptococcus in favorable culture may develop into five billion like organisms in twenty-four hours. He concedes the gonococcus is a somewhat less bounteous provider for posterity. He observes that a person with acute epididymitis, who has for months resisted all forms of treatment, who develops an acute epididymitis, gets up well of his original infection and accounts for this cure on the

basis of absorption of endogenous toxins coming from the gonococci imprisoned in the inflamed area—an ingenious theory, unfortunately not so largely carried out in practice as to make it of large therapeutic value.

### Gonococcal Infection of the Female.

PEDERSEN *(Medical Record,* Feb. 25, 1922) observes that the accurate diagnosis of gonococcal infection is not easy, and he states that in the female at least eight slides should be taken in pairs from the urethra, vulva, vagina, and cervix.

Cultures are essential to real accuracy. The congestion which precedes or follows the menses causes deeply placed organisms to appear on the surface. Expressage of the follicles is helpful. Pedersen holds that none of the well-known means of aborting infections is infallible since the infection may be drawn into the uterus before the application is made. He warns against using chemical measures in overdoses, thus causing vaginitis, which is as hard to cure in some patients as the infection.

He believes that the patient should receive written or printed instruction concerning the dangers to her eyes from infected fingers, and the danger of transmitting the disease to girl babies. Of especial importance in control of disease the author urges that the carrier of the disease should always be sought and treated.

As to the abortive treatment, this must be applied within twelve hours of infection. The chemical formula in itself is not largely important. There must be a true antiseptic which is not largely irritating. The treatment must be continued for five days. Light tampons soaked in appropriate medicine are employed. The painting of the vagina with strong silver solution is not advised.

As to the curative treatment after the disease develops, copious antiseptic douches frequently repeated are advised. They should be hot and should be retained. These should be taken in the lying position with rest on the back for thirty minutes. The author therefore prefers hot potassium permanganate, 1 in 8000, increasing to 1 in 4000, four times daily, one or two gallons at a time, 110° to 115° Fahrenheit within tolerance. A long douche nozzle reaching the utmost limit of the vagina is employed.

# Reviews

PRACTICAL INFANT FEEDING. By Lewis Webb Hill, M.D. Illustrated. W. B. Saunders Company, Philadelphia, 1922. Price $5.

Dr. Hill, who is the Junior Assistant Physician of the Children's Hospital, Boston, and Assistant in Pediatrics at the Harvard Medical School, has dedicated his book of nearly 500 pages to Dr. Morse, whom he describes as a truly great practical clinician and teacher, and he tells us in his preface that he has tried to write a book on infant feeding which shall be practical without being superficial and scientific without being tiresome. His paramount purpose has been to help the practitioner not only to treat but to understand feeding cases as they occur in his daily practice. The question naturally arises as to whether the author has succeeded in attaining the excellent results just defined. Without question there has been too much standardization in infant feeding from mathematical calculations as to the various constituents of infant foods to the crudest kind of mixture.

The book is divided into twenty-one chapters, dealing with the physiology and pathology of digestion and nutrition; then with the stools in infancy; and then come chapters dealing with human milk and breast

feeding. After this the development of modern artificial feeding is taken up, with a description of the modifications of seven well-known pediatrists, as, for example, Meigs, Finkelstein, and Rotch. After a discussion of the various modifications of milk and special preparations, he proceeds to the consideration of digestive and nutritional disturbances in the bottle-fed, recognizing cases of idiosyncrasy to cow's milk, and deals with chronic intestinal indigestion in older children, and then with the care of premature infants. Later chapters discuss rickets, spasmophilia, scurvy, eczema, pyloric stenosis, and pylorospasm.

The book is printed in large type and well leaded, and therefore is easily read, and for this reason is somewhat more bulky than if it had been printed with less lead and smaller type. The paper, however, is light and the volume easily held.

The question which was brought forward at the beginning of this notice as to whether the author has succeeded in his attempt to produce a book which will prove useful to the general practitioner may be definitely answered in the affirmative. He repeatedly gives definite and distinct directions as to how foods are to be prepared and numerous prescriptions for food mixtures and for drugs which may be copied and modified in individual cases as the physician sees fit. The book contains a number of excellent clinical illustrations and is a handy working manual.

THE PLACE OF VERSION IN OBSTETRICS. By Irving V. Potter, M.D., F.A.C.S., Buffalo, N. Y. C. V. Mosby Co., St. Louis, 1922.

Much discussion has been caused by Dr. Potter's development and practice of the operation of podalic internal version. He believes that it is justifiable to perform a version for the purpose of eliminating the second stage of labor, thus relieving the suffering of the patient. In his hands the operation has been attended by no increase of fetal mortality, and has had a lessened maternal mortality and morbidity. The last 938 versions had no maternal mortality and a fetal mortality of .0123 per cent.

In his book he first reviews the history of version in its development, and then comments upon the attitude of obstetricians at the present time toward this operation. He believes that education in obstetrics is deficient, and that obstetricians pay too little attention to the possibilities of version.

He describes in detail his method of performing this operation and illustrates it profusely. Chloroform is the anesthetic, to complete anesthesia. The vagina and cervix are gently but thoroughly dilated by the hand of the operator, lubricated with green soap; the membranes are separated as completely as possible from the uterine wall; the position of the child is accurately determined, and the size of the pelvis is estimated by the hand. Pelvimetry by other methods is not employed. Both feet are brought down, but before rupturing the membranes a towel is wrapped about the wrist of the operator to prevent the loss of amniotic liquid. Delivery is effected very slowly and gently, care being taken to expose the scapulæ before an effort is made to deliver the head. When the head is upon the pelvic floor and the face is in the vulva, ample time is given for the child to breathe. The forceps is very rarely used to deliver the after-coming head. If the cord is tightly coiled about the child it is clamped near the umbilicus and cut. At birth the child is placed across the abdomen of the mother upon its right side.

Version is not undertaken until the cervix is largely dilated and always soft and dilatable. The modified Walcher's position is employed.

The writer employs abdominal Cæsarean section for cases not suitable for version: except upon the after-coming head he uses forceps rarely.

This interesting statement of the writer's work is important from several standpoints. It is an excellent illustration of what an obstetrician can accomplish by devoting himself to the performance of one obstetric operation. It is also valuable because it draws attention to an obstetric operation which undoubtedly is neglected.

The great criticism against the writer's work has been that it will lead others, less

competent, to attempt the operation in cases not suitable and under conditions not favorable. It also seems to indicate that spontaneous parturition should give place to artificial delivery.

As regards the first criticism, this brings up the important question as to whether obstetrics shall become a surgical specialty or whether obstetric practice shall be conducted in the present manner. There has been no essential improvement in the mortality and morbidity of obstetric practice in private houses since that which followed the introduction of antisepsis, and the reason for this fact lies in the circumstances under which most obstetric practice is done. If labor is to be considered a physiological process, requiring little or no attention, then the present system is adequate and satisfactory. But if labor is to be considered a process involving traumatism and requiring surgical precautions and special skill, then a change would be advantageous. Some might not care to go so far as to say that all cases of confinement should be attended by a specialist, but certainly those cases which require assistance and which are in any way complicated demand special attention and special skill and ability. If this view be taken, then the practice of version, as illustrated by the author, is justifiable in the hands of an expert. If the average general practitioner is to perform version to terminate what seems to be a promising spontaneous labor, certainly great harm would result.

The trend of modern medicine is to spare the patient pain in every possible way. Various sorts of anesthesia are available for unimportant as well as important manipulations and operations. So parturition may be considered a process which should be shortened within limits of safety and conducted under anesthesia. If this view be taken, then the so-called prophylactic forceps, now advocated, and version as practiced by the writer of the book, become justifiable.

Since the War, the value of human life has increased considerably from an economic standpoint, and the desire to save as many children as possible may come to have a bearing on the question of obstetric practice. Up to the present time, human life has been so cheap that adequate compensation could not be obtained for the care of parturient women.

The book is an interesting one and suggests problems of interest and importance. It is a record of what a skilful operator can do who becomes especially trained in one operation. E. P. D.

THE PHYSICIAN HIMSELF: From Graduation to Old Age. By D. W. Cathell, M.D. Published by the Author, Baltimore, 1922. Price $3.

This book, in many editions, has now been before the profession for years and must have had a very considerable sale. It has met with the approval of many eminent men in the medical profession. It is definitely a personal book, and the author regards the present edition as his final statement of what he thinks about his theme. The book is not divided into chapters, is copiously provided with italicized sentences, and in many instances gives excellent advice as to the conduct of the physician in the presence of disease. We trust that the endeavor of the author to continue the popularity of the book may prove successful.

THE THYROID GLAND. Edited by Amy F. Rowland. Freely illustrated. W. B. Saunders Company, Philadelphia, 1922. Price $5.

This octavo volume of 228 pages consists of a series of clinics by Dr. George W. Crile and his associates dealing with the function of the thyroid gland, the rôle of the adrenals in exophthalmic goitre, diseases and pathology of the thyroid gland, and the various complications which arise as a result of disease in this organ. One of the contributors writes upon the Adrenalin Sensitization Tests for Hyperthyroidism; another on the Use of the X-Rays in the Treatment of Goitre; another on The Value of Basal Metabolism Studies; and still another on The Prevention of Simple Goitre in Man. There is also a clinic upon Surgery versus the X-Ray in the Treatment of Hyperthyroidism, and a discussion of the Preoperative Management of Exophthalmic

Goitre. Agatha Hodgkins contributes an article upon The Administration of Nitrous Oxid-oxygen Analgesia in Operations on the Thyroid Gland, and Gibson one upon The Post-Operative Treatment of the Exophthalmic Goitre Patient.

The book is freely illustrated, handsomely printed, and will undoubtedly prove useful and interesting to those who are concerned with patients suffering with disorders of the thyroid gland and who are not.

THE PHYSIOLOGY OF GOUT, RHEUMATISM AND ARTHRITIS. By Percy Wilde, M.D. William Wood & Company, New York, 1922. Price $3.50.

The title of this book leads one to wonder whether the author has really been able to adequately describe what he calls the physiology of gout, rheumatism, and arthritis, for without doubt these conditions have been the opprobrium medicorum for generations. It would appear to most of us that until the physiological chemist makes further advances in his field of research fundamental information in regard to these conditions must still be lacking.

When we come to an examination of the text we find that Dr. Wilde has certain views to present which represent his own conception of this subject, and we also find, to use his own words, that the object of this work is to describe the methods and line of investigation which have enabled him to treat successfully a large number of disorders commonly described at the present time as arthritis and neuritis and which are regarded as either intractable or incurable. He freely admits that he has discovered no drug or invariable system of diet, or method of administering vaccines, which will accomplish the desired end. He evidently is not friendly to that school of physicians who attribute many of these manifestations to bacterial infection, and he quotes Sir Michael Foster as saying that the "whole story of protein metabolism consists at present mostly of guesses and gaps," with which view we are somewhat in accord.

We judge that Dr. Wilde is still one of those who believes that uric acid, in one form or another, is a cause rather than the result of the maladies which he discusses. He freely admits that he does not know of any treatment which will cure true arthritis deformans, but he makes the somewhat unusual statement that gonorrheal rheumatism is a comparatively rare joint disease because it lacks the intervention of some cause which checks secretion. He then goes on to state that if such cases are treated in the early stages by methods which liberate lactic acid from the tissues they give very little trouble. We doubt if this view will be generally accepted.

As a presentation of Dr. Wilde's personal views the book possesses much interest. How well it will be received by the general profession as an adequate guide in the treatment of the difficult conditions of which it deals remains to be determined. It at least possesses one advantage, and that is the advantage of distinct optimism as to a class of patients about whom a cloud of pessimism often is constantly present.

THE TREATMENT OF ORDINARY DISEASES. By Beverley Robinson, M.D. The American Medical Publishing Company, New York, 1921.

In this little book of 131 pages, Dr. Beverley Robinson, who was at one time Clinical Professor of Medicine at the University-Bellevue Hospital Medical College, New York, presents his views in regard to the treatment of the acute infections and of diseases of the secretory organs, as well as poisoning, minor accidents, fractures, sprains, and hemorrhoids. He also has a chapter on favored remedies. He dedicates his little brochure to the elder Janeway, Delafield, and others who served to make New York medicine famous. The book is practically a plea to hold on to that which has been proved to be good by the fathers in medicine. He does not deal extensively with what might be called essentially modern methods, chiefly representitng the procedures which Dr. Robinson followed when, as a younger man, he was an active practitioner. For this reason the practitioner of to-day will fail to find an adequate dis-

cussion of many topics which a text-book published in these days might be supposed to contain. On the other hand he will find many excellent hints as to methods of treatment which are just as good to-day as they were in years gone by, and we all know that even if some of these methods do not seem to be based upon scientific investigation, they, nevertheless, prove remarkably adequate.

A TEXT-BOOK OF PRACTICAL THERAPEUTICS. With Especial Reference to the Application of Remedial Measures to Disease and Their Employment upon a Rational Basis. By Hobart Amory Hare, M.D., LL.D.; 18th edition, enlarged, thoroughly revised, and largely rewritten. Illustrated. Lea & Febiger, Philadelphia, 1922. Price $6.50.

When a book has reached its eighteenth edition it should be revised more thoroughly than ever before. In order that it may represent modern therapeutics it should be gone over by the author so thoroughly that the publisher will find it impossible to use the old plates and must set it up in new type. These things have been done. In the preparation of the text the same constant endeavor has been made as heretofore to meet the needs of the man actually dealing with patients, who wants to know what to do, how to do it, and how results are to be best obtained. As was said in the preface to the last edition:

The author must hold fast to that which is good and cast aside that which has become obsolete, but in doing this he must not permit his desire to accept the new to overcome respect for the old, if the old has the indorsement of long experience on the part of his fellows and himself.

The last thirty years have done much not only to put hitherto empirical methods upon a scientific basis, but to develop new plans of treatment, and, in the repeated revisions of this book, the author has endeavored to include all facts that have proved their value and certain new ones which are still on trial but promise much, as, for example, silver arsphenamine in syphilis, quinidine sulphate in auricular fibrillation, thyroxin in hypothyroidism, and the use of the anterior lobe of the pituitary. The pages on transfusion have been largely rewritten, as have those dealing with renal disease.

As in the earlier editions, so in this, the author wishes to acknowledge the kindness of his friends who have revised articles dealing with subjects in which they are recognized authorities, namely, Dr. G. E. de Schweinitz, Professor of Opthalmology, the articles on diseases of the eye; Dr. Edward Martin, formerly Professor of Surgery, those on venereal diseases; and Dr. Barton C. Hirst, Professor of Obstetrics in the University of Pennsylvania, those which touch upon the disorders of parturition or pregnancy.

RADIUM THERAPY. By Frank Edward Simpson, A.B., M.D. Illustrated. The C. V. Mosby Company, St. Louis, 1922. Price $7.

This handsomely printed book contains 166 original illustrations, although it covers only 391 pages including the index. The author writes as one who is actively engaged in the practice of radium therapy, and as he is a Professor of Dermatology in the Chicago Polyclinic, it is natural that most of what he has to say deals with the use of radium in the treatment of lesions of the skin, although adequate consideration of the employment of this agent in the treatment of more deeply situated organs, as, for example, the thyroid, the cervical glands, the esophagus, the bladder, the breast, the cervix uteri and other areas are carefully considered. He well points out that the difficulty in employing radium in the treatment of sarcomata lies in the fact that there is nearly always metastasis before the patient presents himself for treatment. He has much to say that is interesting in regard to the employment of radium on lymphatic leukemia, showing one case in particular with marked objective symptoms and with a blood count of 113,000, in which after radium treatment in the space of about three weeks there was a total white count of 7500, with almost disappearance of the lymph nodes in the axillary areas and in the neck.

A very exhaustive bibliography, covering the literature of all nations, takes up no

less than 60 pages of the volume. The work is one which therefore can be turned to as a sort of index medicus upon this subject. The author deserves great credit for the lucid manner in which he has presented his opinions and for the industry with which he has brought together the opinions of others.

HYPERPIESIA AND HYPERPIESIS. A Clinical, Pathological and Experimental Study. By H. Batty Shaw, M.D., F.R.C.P. The Oxford University Press, London and New York, 1922. Price $6.50.

Dr. Shaw is known to a considerable number of the American medical men because of his contributions to medical literature. He dedicates his volume, which comes out in a very handsome style, to Sir Clifford Allbutt, who is the originator of the term hyperpiesis.

The text is illustrated by 11 figures, 4 charts, and 8 tables. After a general introduction, he deals with clinical and post-mortem reports in cases of hyperpiesia, and then goes on to an analysis of the clinical details of such cases in connection with the causative factors, the mode of death, and the morbid anatomy found at autopsy. In another section he deals with search by experiment for pressor substances which act through the blood stream but cause a rise of blood-pressure, and in this section considers uremia and eclampsia, bacterial pressor substances, terminal infections, both high and low blood-pressure, albuminuria, and neuroretinitis. The last section of the book is devoted to his conclusions and to the therapy of hyperpiesia, including rest, diet, purgation, baths, climate, and symptomatic treatment and the need for asepsis. He also considers life insurance in relation to high blood-pressure, and, finally, the question of syphilis, general anesthetics, and the operation for glaucoma in such patients.

Some parts of the book are definitely sketchy, while others are more thorough and exhaustive. Of the sketchy type we find on the last page five lines devoted to syphilis, of which two lines contain the rather obvious statement that "the risk of rupture of blood-vessels already weakened by syphilis is greater in the condition of high pressure than when the blood-pressure is normal."

The chapter on Treatment could very well be increased in scope and with little effort. It is not in sufficient detail to be of material value to the practitioner. Summing the matter up, the book is to be considered rather an essay upon this topic than an exhaustive treatise.

THE PRINCIPLES OF ELECTROTHERAPY AND THEIR PRACTICAL APPLICATION. By W. J. Turrell, M.A., M.D. Oxford University Press, London and New York, 1922. Price $3.85.

The author tells us in his Preface that this book is the outcome of an attempt to explain the therapeutic action of electricity upon rational grounds and upon physiological principles.

In Part I the currents of electricity are discussed and the necessity of clearly distinguishing between polar and interpolar currents is pointed out. The action of both high-frequency currents as to quality and quantity is fully discussed.

The second part of the volume deals with the difficult task of explaining the therapeutic action of radiant energy.

The third part is concerned with electrodiagnosis, and the fourth explains the action of electrotherapy in some of the diseased conditions for which it is applied. The author tells us that no student of the history of electrotherapy can fail to recognize that this form of treatment was first placed upon a scientific basis as a result of the work of French scientists, from whom he draws a large part of his information, although he acknowledges the assistance received from the writings of Snow of New York and others in England.

Some idea of the thoroughness of the work can be obtained from the statement that the discussion on currents of electricity covers 61 pages, that upon radiant energy 20 pages, the part dealing with electrodiagnosis 17 pages, and direct electrotherapeutics 117 pages. The volume contains 29 illustrations designed to aid the reader in his study of the text.

NERVE EXHAUSTION. By Maurice Craig, C.B.E., M.D., F.R.C.P. Lea & Febiger, Philadelphia, 1922.

Dr. Craig is Physician for and Lecturer in Psychological Medicine in Guy's Hospital, London. He divides his little book of 143 pages into six chapters, in which he deals chiefly with the causation and symptomatology of nerve exhaustion, devotes one chapter to the consideration of sleeplessness, another to diagnosis and prognosis, and the sixth to treatment. As he well points out the treatment of nerve exhaustion must of necessity cover a very wide field, and again that the successful treatment of functional nervous disorders includes a thorough knowledge of medicine, including the study of the mind in its normal and abnormal states, necessitating a knowledge of human life and all that this stands for. He then goes on to point out that the treatment of the more severe forms of the functional nerve disorders continues to be greatly hampered by legal considerations, in that the law does not permit of any person of unsound mind being treated in any home or hospital unless that person is certified according to the requirements of the Lunacy Acts.

Prophylactic treatment in the young he believes to be of great value. As to actual curative treatment, he mentions psychotherapeutics, persuasion, suggestion, hypnosis, and psycho-analysis according to Freud, devoting the largest part of his chapter on Treatment to Freudianism. He then deals with rest, climate, exercise, massage, breathing exercises, baths, and electrotherapeutics.

Possibly the most surprising statement he makes is that the bromide salts are invaluable in the treatment of nerve exhaustion, although they are not always employed to the best advantage. Certainly there are many cases of nerve exhaustion in which the bromides are deleterious, and the author recognizes that if they are too freely used such a result inevitably occurs. He claims, moreover, that a small daily dose of bromide may enable the hard-worked professional or business man to continue work with comfort for years, while if he stops taking it marked symptoms of exhaustion may develop within a few months. We confess that this statement is surprising. Half a page is devoted to inoculation therapy and a page and a half to convalescence.

THE CLINICAL METHOD IN THE STUDY OF DISEASE. By R. M. Wilson, M.B., C.H.B. Oxford University Press, London and New York, 1922. Price $1.50.

This little book contains only 56 pages in large type which is heavily leaded, and we confess that we are a little in doubt as to why it should have been brought into existence. It begins with a biographical note on the life of Dr. Horace Dobell, with whose contributions to medicine this little volume is concerned. Although Dobell retired from practice in London in 1886, he lived in retirement for nearly thirty years, and on his death the author found himself his literary executor, with instructions to use his discretion as to the publication of a memoir.

To those who are interested in brief biographical literature this book, which might have been entitled more correctly "A Memoir of Horace Dobell," may prove of interest.

OPIATE ADDICTION: Its Handling and Treatment. By Edward Huntington Williams, M.D. MacMillan Company, New York, 1922. Price $1.75.

The author of this book is eminently a firm believer in the value of the so-called Harrison Narcotic Act, although he admits that the number of drug takers and the amount of drugs consumed to-day, after five years of this active legislation, is just as great as it was five years ago, if not indeed considerably greater. He endeavors to answer the question, Why has the Harrison Narcotic Act failed to accomplish the purpose for which it was formulated? and does not believe that its failure is due to inactivity on the part of officials. His thought is that the fundamental defect of the law lies in not giving sufficient consideration to the human question in opiate addiction. In

other words, these addicts are abnormal mentally and physically, but we fail to see how any law could well deal with these abnormal states. Notwithstanding these facts, the author makes the suggestion that the present law should be further enforced with stringency, with the hope that the obtaining of opium may be made still more difficult. We are glad to say that he appreciates that excessively strict laws would cause untold suffering among countless numbers of innocent persons infected with innocent diseases, who far outnumber the addicts. Apparently the author is rather in favor of the ambulatory method of treatment which many others have strenuously condemned. Finally he admits that the narcotic addict, like the poor, is likely to remain with us, and that only the visionary idealist can believe otherwise.

HAY-FEVER AND ASTHMA. By William Scheppegrell, A.M., M.D. Illustrated. Lea & Febiger, Philadelphia, 1922.

As every one knows, the author of this book is *facile princeps* among those who have devoted much time and energy to the investigation of these annoying and obscure conditions. There are undoubtedly many cases of asthma which have no relationship to hay-fever or any of the causes which induce that malady, but there are other instances in which the two undoubtedly go hand in hand, and both of these states cause so much misery that they deserve exhaustive consideration even though death rarely results from their onset.

The book opens with a colored plate showing two forms of ragweed and contains a large number of illustrations of pollen and flowers and plants which are supposed to induce the symptoms characteristic of hay-fever.

The author deals with the manner of conveyance of the infection, the history and prevalence of hay-fever, the influence of age, sex, occupation, and race, as well as the effect of seasons, means which can be taken to prevent the malady, and then, in comparatively brief space, deals with the treatment in a chapter covering seven pages. In another, dealing with immunization, he utilizes eight pages. In the chapter on hay-fever in children he considers the relation of adenoids and diseased tonsils to the treatment of asthma. The text is obviously more largely devoted to hay-fever than to the latter disease.

This book represents an enormous amount of investigation on the part of its author and brings to us in a concise form the views which he has expressed from time to time and which have been scattered perforce through a large number of contributions.

THE INTERNATIONAL MEDICAL ANNUAL. A Year Book of Treatment. William Wood & Company, New York, 1922. Price $5.

This Annual has appeared for forty years, the contributors nearly always being representative men in England and America, although being originally an English publication the British contributors are naturally much more numerous than those of this side of the water. The list of those who have prepared long or short articles for this issue fully maintains the reputation which previous lists have deserved. The book it will be remembered consists of a series of abstracts of articles which the various collaborators deem to be of sufficient importance to deserve consideration. It is copiously illustrated. Including the index, it contains 534 pages. The quality of the contents is excellent.

A MANUAL OF CLINICAL LABORATORY METHODS. By Clyde Lottridge Cummer, Ph.G., M.D. Illustrated. Lea & Febiger, Philadelphia, 1922. Price $5.50.

The author of this book is Associate Professor of Clinical Pathology in Western Reserve University and Associate Clinical Pathologist in the Lakeside Hospital. He has endeavored to prepare a manual for the use of students and practitioners which will represent present clinical laboratory methods in concise and accessible form, and he places at the end of his text quite a long bibliography containing the titles of textbooks and monographs which he believes are of importance. Special pains are taken in some sections to give minute details, as for example in blood-cell counts. No less

than 198 pages are devoted to the blood, not only its microscopical examination in various diseases, but as to the parasites of the blood, serum reactions, and its chemical analysis. More than 60 pages are devoted to an examination of the urine and 25 to the examination of gastric and duodenal contents, while 36 are given to the examination of the feces. Succeeding chapters deal with the examination of the sputum, the examination of exudates and transudates and bacteriological methods, and finally an appendix is prepared dealing with stains and technique in the laboratory.

This book is without doubt an excellent working manual. It is in large type, easily read, and indicates that the writer in preparing his text bases it upon his own work. For the general practitioner the chapters devoted to the urine and blood will probably prove most valuable. The colored plates are excellent. The book is one to which we expect to refer frequently.

THE OXFORD INDEX OF THERAPEUTICS. Edited by Victor E. Sorapure, M.B., C.H.B., F.R.C.S. (Edin.). The Oxford University Press, London and New York, 1922. Price $12.

In a volume of 1126 pages the editor of this handbook has brought together a series of articles contributed by a very large number of English medical men, the list of contributors covering no less than nine pages. The text is arranged alphabetically under the headings of various diseases, beginning with Abscess and ending with *X*-ray Therapy. In a comparatively brief part of the book, about 90 pages is devoted to a list of the agents which are commonly employed in medicine; in other words it is a materia medica list beginning with Acacia and ending with Stimulants, under which heading we notice alcohol and strychnine.

The book contains a number of illustrations, but not very many, in black and white, and is designed to be essentially a quick reference handbook for the practicing physician, who wishes after seeing a case to turn to a volume which will give him hints as to the best methods which he is to employ in its relief.

SURGICAL AND MECHANICAL TREATMENT OF PERIPHERAL NERVES. By Byron Stookey, A.M., M.D. With a Chapter on Nerve Degeneration and Regeneration by G. Carl Huber, M.D. Illustrated. W. B. Saunders Company, Philadelphia and London, 1922. Price $10.00.

Stookey particularly aims, in this book, to base his teaching on embryology, anatomy, and physiology, to use and apply the lessons learned in the laboratory and the clinic, and to select and advocate only those procedures which have stood the test of time and trial at the hand of the expert; nor has he hesitated to expose certain fallacies which have obtained to the discredit of neurosurgery. The book is done in Saunders's best style.

The first chapter is devoted to anatomy, admirably illustrated, clear, explicit, and helpful. Thereafter follow chapters on Regeneration and Degeneration of Nerves, Repair, Methods of Implantation, Stimulation, Preparation, Nerve Suture, Causes of Failure, and Mechanical Treatment.

The surgery of individual nerves is then taken up; the brachial plexus, musculospiral and circumflex, the musculocutaneous, the ulnar, the lumbar sacral and plexus, and the sciatic. Other nerves less frequently injured are individually considered; thereafter nerve tumors, causalgia, and amputation neuroma.

At the end of each chapter there is a bibliography; and an excellent index is appended. The author has the gift of clear expression in simple language, and puts much in small space. He has avoided fruitless discussion, indicates clearly his beliefs, and has written a book which is assured a welcome by all operating surgeons. His optimism regarding the future of peripheral nerve surgery is not universally shared by those who have had large experience.

# Notes and Queries

**The Invention of Dover's Powder.**

In an editorial on this subject the *British Medical Journal* of February 18, 1922, states that among the members of our profession who have had a life of adventure—and there are many of them—few names are more familiar in our mouths than that of Thomas Dover (1660-1742), who, as Venn pointed out in his series of "Academic Sports," took his B.A. at St. Mary's Hall, Oxford, and the M.B. from Caius College, Cambridge, and became a captain in a buccaneering expedition, in which capacity he in 1710 rescued Alexander Selkirk, whom Defoe made immortal as Robinson Crusoe. Eventually Dover began the practice of medicine in London, where he became known as "the quicksilver doctor" on account of his cure for asthma and many other ills—namely, "an ounce of quicksilver daily to be taken at what hour the patient pleases, and a spoonful of the gas of sulphur in a large draught of spring water at 5 o'clock in the afternoon and at bed-time." In his well-known collection of biographical essays, "An Alabama Student" (1908), the late Sir William Osler gave an attractive account of this "physician and buccaneer," with many details about his popular work, "The Ancient Physician's Legacy to his Country," "designed for the use of all private families." To the February number of *The Bookman's Journal and Print Collector*, which we are given to understand is the only periodical in the world devoted exclusively to the collecting of books and prints, Dr. Philip Gosse, the son and grandson of leaders in literature and zoölogy respectively, contributes a brightly written sketch of Dover's adventures as a pirate, based mainly on a rather rare book, "A Cruising Voyage Round the World." This book was begun in 1708, and, according to the title-page, contains "Remarkable transactions, as the taking of Puna and Guayaquil, of the *Acapulco* ship and other prizes: an account of Alexander Selkirk's living alone four years and four months on one island, etc., etc., 1721," by Captain Woods Rogers, who commanded the expedition of two ships—the *Duke* and the *Duchess*—fitted out by the merchant adventurers of Bristol at the instance of William Dampier, the famous circumnavigator, freebooter, naturalist, and hydrographer. Dampier, then 56 years of age, went as pilot, and Dover, who was practicing in Bristol, was chosen as second in command, not because he had any knowledge whatever of the sea or ships, but, strange as it may seem, on account of his bad temper; for it was shrewdly argued by the merchant adventurers, who were financially interested in the expedition, that Dover's vile temper would render him so unpopular that he would not have any followers should he attempt to break away from the main party—a danger that had led to the failure of previous expeditions in which a popular second in command had been persuaded by a discontented party to go off on a separate cruise. As may be imagined, the voyage was not free from quarrels over the distribution of the spoils. After sacking Guayaquil the English sailors stored their plunder in the churches and spent the night there to guard it, but their sleep was much disturbed by the smell of corpses recently buried as the result of an epidemic of "plague." Next day they returned to the ships, but within forty-eight hours 180 of the crew of one ship were down with the plague; here Dover stepped in and ordered the ships' surgeons to bleed every sick man to a hundred ounces, and to give large draughts of dilute sulphuric acid; it is recorded that this drastic treatment was justified by the recovery of all but eight patients. Dr. Philip Gosse concludes his interesting note with the remark that "Harley Street might be searched to-day from end to end and not such another found." This no doubt is true.